ALPACA HANDBOOK

For Youth, Groups, Leaders, and Breeders

Alpaca Owners Association

What is Alpaca Owners Association?

Located in Lincoln, Nebraska, Alpaca Owners Association, Inc. (AOA) is the world's largest alpaca association.

Our Mission

We advance responsible alpaca ownership and breeding through our world-renowned registry, comprehensive education, leadership and vibrant member community. Through member and volunteer support, we build a community where we ensure the long-term sustainability and success of alpaca livestock for current and future generations.

Our Vision

To be the definitive livestock model and global leader advancing all aspects of alpaca ownership—from breeding and health to fleece utilization and business development—while growing a thriving community that champions the alpaca industry's future.

Our Purpose

- To promote awareness of alpaca and alpaca products;
- To maintain an official DNA validated genealogical registry system;
- To administer an alpaca show system;
- To provide education to the Association's members and to the public about the operation of sustainable alpaca businesses;
- To market alpaca and the use of alpaca products;
- To promote scientific research to benefit the alpaca industry; and
- To do any and all things necessary or incidental to achieving the purposes specified above.

Table of Contents

CHAPTER 1

An Introduction for Leaders and Parents

Purpose of the Manual

The primary purpose of this manual is to educate and engage youth in the alpaca industry. It serves as a resource for learning about alpacas, their fleece, and related products. The goal is to help leaders create positive experiences that encourage young alpaca enthusiasts to stay involved in the industry as they grow older. Additionally, the manual serves as a resource for both new and experienced alpaca owners and caretakers.

Balancing content for both younger and older children can be challenging. This manual aims to provide valuable information for leaders and parents, supporting their efforts to advance youth knowledge. Younger children may need additional assistance from adults to understand the material.

In the mid 1990's Jeannie Flavin of Santa Rosa Ranch compiled a *Leaders Manual* to assist alpaca owners to form and run alpaca 4-H clubs. She relied on the assistance of alpaca industry

experts and the 4-H organization to review her compilation. This manual is not a 4-H document. We would like to acknowledge the tremendous work of Jeannie Flavin as well as the contributions made by the following individuals: LaRue Johnson, DVM Colorado State University; Murray F. Fowler, DVM, Professor Emeritus UC Davis, California; Susan Stackhouse; Eric Hoffman; Cecile Champagne; Phil and Chris Switzer; Leah Dewald; Marty McGee-Bennett; and Kathryn J. Milne of the Jefferson County, Colorado 4-H.

Starting an Alpaca Youth Group

By forming an alpaca club or group, both leaders and parents play a key role in making our children's experience with alpacas as positive as possible. The following are considerations to help ensure that.

Defining the Purpose of the Group

In the past, alpaca clubs have focused primarily on alpacas as an opportunity for children to learn to care for and work with alpacas. Often these experiences culminate in competitions at local fairs or at AOA alpaca shows. But a leader may decide that they would rather focus their group on doing things with alpaca fiber, perhaps engaging their club members with learning fiber arts such as felting, knitting, crocheting, weaving, dyeing, or spinning. Perhaps the purpose of the club is to train alpacas to serve as ambassadors visiting schools, participating in parades, or visiting nursing homes. Certainly, a club could have activities that include all the above. Before you recruit children to your club you should define what the club and its activities will focus upon.

Determining the Size of Your Club

Before inviting children to join your club, think about the space, resources, and adult helpers available. It is strongly recommended that a club leader have at least one assistant who can help during meetings or step in as a substitute if the leader is unable to attend. Many parents are willing to become club partners to help at meetings with activities. Often parents may be unable or unwilling to help, so be certain that the number of members you invite is manageable. The age and maturity of the participants will make a big difference as well, both in their abilities to participate and complete certain projects, as well as how long they can remain engaged. If this is your first youth club, consider starting with a small group to avoid becoming overwhelmed. You can gradually add more members in subsequent years if you wish.

Recruiting Members

A great place to begin looking for members is to contact local alpaca breeders. They may have children that would be interested in joining, or may know of other families that might. The AOA website has a feature to find farms based on location. Another natural place to begin seeking members for your club would be your local schools and homeschooling groups. You could ask local schools to place a notice in their communications to parents. If you are interested in participating in your county fair, you could contact your local extension office to see if they have any interest in including alpacas and know of potential participants.

Selecting a Meeting Location

Where you meet will be determined in part by what your club is interested in doing. Libraries, schools, and county extension offices can be used for club meetings. Meetings can occur in your own home or farm if you have adequate space. It is advised if you are planning to host the event in your home or farm that you check

with your home and farm insurance policy to be certain you have appropriate coverage.

Safety

It is imperative that the environment that we place our children in is as safe and welcoming as possible.

Leaders must ensure that the children are knowledgeable about the dos and don'ts of handling alpacas before they begin work with them. Parents must be certain that their children have a level of maturity and self-control that allows them to handle alpacas in a responsible manner.

The areas on the farm where the children will be working with alpacas should be free of dangerous items or hazards. If obstacles are used for training, they should be well designed, constructed with sturdy materials, and include adequate safeguards such as rails to prevent falling. The alpacas that are used should have temperaments that allow safe handling.

Youth organizations around the country are now requiring that adults working with children in formal settings such as schools, 4-H, churches, or other clubs have specialized training in child safety. Formal background checks may also be required. The Alpaca Owners Association strongly recommends, but does not currently require this of adult volunteers working with children.

The club environment should be emotionally safe so that an adult quickly intervenes if they see any bullying or belittling behavior on the part of youth or adults. And, of course, if a parent or leader is suspicious of any physical or sexual abuse, they should immediately report it to the required authorities.

Communication

It is also extremely important that the lines of communication between leaders, parents, and youth are open and clear. The following is a list of items to assist with that:

- Calendars/Schedules with all pertinent club activities and dates
- Clearly outlined expectations of the youth participants (2 copies suggested- one for parents and one for club members)
- Current contact lists with names, addresses, emergency contact information, and email addresses for each child and their parents or guardians
- Fee Schedule for participation in the club and its activities
- Required materials for activities
- Any optional activities in addition to the regular club activities
- A listing of additional resources youth and parents might use such as books, websites, or other educational materials

Cultivating Leadership Skills

Raising and caring for livestock and belonging to a club that creates positive experiences helps develop life skills in our youth. There are several opportunities within an alpaca club that foster such growth:

- Caring for another living being develops empathy and a sense of responsibility
- Working with fellow club members creates opportunities where youth can mentor one another, particularly those younger than themselves
- Keeping records of expenses to care for their alpaca helps teach financial skills

- Keeping health and nutrition records teaches how diet and environment affect overall health
- If the club has youth officers, elections teach about the democratic process, and the responsibilities associated with holding an officer position
- Activities and competitions help build camaraderie and how to accept both winning and defeat with grace and good manners.

Community Service

Many agricultural youth groups have a club activity specifically to benefit others. There are many options, and it can be beneficial to allow the club members decide what they would like to do as a group. There might be more than one activity and it could change from one year to the next. The club may:

- Do a fundraising activity such as a garage sale to benefit a special cause in their community
- Take alpacas to a nursing home
- Participate in a parade
- Bake alpaca-shaped cookies to take to a homeless shelter
- Knit, crochet, or felt items for people in need
- Assist at alpaca shows with handling alpacas or loading and unloading trailers for exhibitors

Alpaca Owners Association Shows and Events

Of course, it would be wonderful if youth participation in alpaca shows increased. If leaders and parents think that their club or individuals from the club might be interested in showing their alpacas, they should contact their local AOA Affiliate as soon as possible to seek out shows to participate in. Competitions for youth include Showmanship, Obstacle, and Public Relations. Clubs may also be able to work with affiliates to create "fun" classes that allow even more youth participation. Recently AOA has added Youth Halter Classes and Youth Judge Training and Competition to the show system. There are also fleece and fiber arts competitions where club members can compete. A list of alpaca affiliates can be found on the AOA website.

County and State Fairs

Many alpaca groups participate in county and state fairs. Contact your local extension office to find alpaca shows in your area. If your county does not have alpaca competitions, consider fairs in neighboring counties. Extension offices can also provide valuable resources, including information about 4-H clubs that participate in sewing, fiber arts, and crafts, which your club members might join.

At the state level, alpacas often compete in various events, and youth can participate in art shows. To explore these opportunities, check your state fair's website.

County and state fairs usually mark the end of the 4-H club season. It's important to know the timing and requirements for these events, even if you're not part of a 4-H club. In many counties, you can compete even if you're not in a 4-H or FFA club.

Expectations of Club Members During Club Activities or at a Show

- Club members will always be kind, respectful, and helpful to other youth participants, Club Leaders, and parents.
- By participating in Club activities and AOA Certified Shows, Club Members are representatives of their club and the alpaca industry, therefore, all Club Leaders, Club Members, and their parents, should always conduct themselves in a positive, professional, and kind manner.
- When participating in club activities at a show or in public, attire should be neat, tidy, and appropriate for the activity—not provocative or displaying offensive language or illustrations.
- When competing in an AOA Show, Club Leaders, Club Members, and their parents are expected to know the AOA Show System rules as presented in AOA Show System Handbook.
- Leaders, Parents, and Club Members shall not engage in the following activities or behaviors while attending Club activities or AOA Certified Shows:
  1. Any negative, obstructive, or disruptive behavior.
  2. Use any abusive or foul language.
  3. Be cruel or mistreat any alpacas.
  4. Be dishonest in any way about themselves, their animal, or their club.
  5. Falsify any documents or information required to participate in club activities or AOA Shows.
- AOA registered alpacas are the only animals permitted at AOA Certified Shows, with the following exceptions
  1. Service animals, as defined under the Americans with Disability Act (ADA), are allowed at club activities and AOA shows under the conditions as specified under the ADA. The presence of emotional support or therapy animals is at the discretion of the Club Leader and those putting on the event or show the club is participating in. If another animal is being brought to an activity or show, notification of the Club Leader and show management prior to the show must be given.
  2. Alpacas entered into Youth Performance classes are not required to be AOA registered.
- At AOA shows, the Judge's final decision shall not be challenged except on the grounds that the Judge has committed a breach of the AOA Show System rules. Any complaint must follow proper procedures as set forth and must include reference to the specific Show System rule(s) allegedly violated.
- The Judge may, at their absolute discretion, direct the removal of a person from the Judge's ring or from the fleece room on the basis of bad conduct.
- Violation of any of the rules and standards of proper conduct written here may result in immediate expulsion from the club or AOA show venue.

Club Member Signature: _____

Club Leader Signature: _____

Parent / Guardian Signature: _____

CHAPTER 2

What is an Alpaca?

South American Camelids

Alpacas, or Alpaca vicunos, are members of the camel (Camelid) family of South America. Their ancestors originated on the central plains of North America about 10 million years ago. These llama-like ancestors migrated south to what is now South America and evolved into primitive examples of today's Alpacas Guanaco and Vicuna.

By the end of the last ice age (10,000–12,000 years ago), Camelids no longer existed in North America. It is believed that alpacas were domesticated from the wild vicuna in the Andean highlands of Peru about 7,000 years ago, and they are among the oldest domestic animals in the world. Alpacas are found in South America in Ecuador, Bolivia, Peru, and Chile west of the Andes Mountains.

Today's Camelid family includes the two humped Bactrian camel of Asia, the one humped Dromedary camel of the Mid-east and Africa, and the New World Camelids in South America—the guanaco, the llama, the alpaca, and the vicuna. Of the New World Camel family, only the alpaca and the llama are domesticated, although annually there are roundups of vicuna called chacus where the vicuna are shorn for their fleece. The fiber harvested from these vicunas is the finest and most valuable animal fiber in the world.

For thousands of years the alpaca was intensively selected and bred by the Inca for their fleeces of abundant, fine fiber. The alpaca was involved in every aspect of the Andean civilization. Besides providing fleeces for warm, luxurious clothing, they were also used for

Alpacas are part of the Camel Family which originated in the area around Kansas and Nebraska in the United States!

meat, hides, and as religious symbols. Even their dung was collected and used for fires in peasant homes.

South American alpaca husbandry reached its zenith in the 11th and 12th centuries A.D. under the Inca Empire. During the 16th century, when the Spanish conquered Peru, the alpaca was viewed as an inferior animal to the Spanish sheep and cattle, driven from its pedestal in the Incan Empire, and sent to the higher elevations of Bolivia and Peru known as the "altiplano" (high plains). This area is above 14,000 feet elevation and is a very harsh environment, but the alpaca adapted amazingly well, and did survive, but due to the limited vegetation and husbandry practices (and slaughter by the Spanish), the numbers of alpacas remained relatively small. According to some sources, today there are over 3.5 million alpacas in Peru (roughly 90 percent of the world resource).

The United States had its first importation of alpacas from Chile in 1983, and then in 1984 and 1988. In 1991 we received our first importation from Peru. Importations and breeding has grown the United States alpaca herd to over 200,000 alpacas in the Alpaca Owners Association Registry. There are also large populations of alpacas in Australia and Canada as well as smaller numbers in Great Britain, Europe, New Zealand, and southern Africa.

Where Are Alpacas Raised?

Alpacas now live across North America, from Florida to Quebec and Alaska to Maryland. They are remarkably resilient animals, successfully adapting to both very hot and very cold climates. In hot, humid areas, alpaca owners must take extra precautions to prevent heat stress. These include shearing fleeces before the heat index rises, providing fans and ventilation in the barn, offering cool, fresh water, and hosing off their

bellies, where heat dissipates, on extremely hot days. In colder climates, alpacas need adequate shelter to protect them from wind, rain, or snow.

Compared to other livestock, alpacas are easy to care for. They need clean, fresh water; adequate pasture or hay; minerals; and shelter to protect them from extreme weather. Some owners also choose to provide additional food supplements, such as grain or pellets.

Alpacas are environmentally friendly and have efficient digestive systems. You can usually raise two to eight alpacas per acre, depending on terrain, seasons, rainfall, pasture availability, and access to fresh water. They can also be kept on a dry lot and fed grass hay, minerals, and fresh water.

Since their only defenses are kicking or spitting, alpacas require sound fencing at least five feet tall to keep predators like wolves, coyotes, and dogs out of their pastures. In extreme weather conditions, very hot or very cold, extra care may be necessary to keep them comfortable.

Who Owns Alpacas?

One of the most interesting things about our North American alpaca industry is the diversity of alpaca owners. The alpacas' smaller size, gentle nature, and ease of care make them

popular with both young and old. Many alpaca owners had little or no experience with livestock before owning alpacas, while some come from extensive agricultural backgrounds. Alpacas are a great choice of livestock for the family. Children as young as four can handle a well-trained alpaca with an adult's assistance. Their fleece is attractive to those who enjoy the fiber arts and going to alpaca shows and competing can be great fun for all ages.

What Are Alpacas Raised For?

All around the world, alpacas are raised primarily for their soft and luxurious fleece. Each shearing produces roughly five to ten pounds of fleece per animal, per year. Alpaca fleece is considered a specialty fiber due to its limited availability and exquisite characteristics. It is recognized for its fineness, softness, light-weight, durability, thermal qualities, and luster. It can be made into a wide array of products from next to skin apparel, to beautiful carpets. The only fleece finer than the alpaca is from its cousin the vicuna, which remains wild and protected in South America.

Each spring, across North America, alpacas are shorn to harvest their fleeces. Alpaca owners may sell their fleeces to individuals or cooperatives, they may choose to send their fiber to a fiber mill for processing into yarn that they may sell or use themselves, or they may keep it for use in their own artistic endeavors.

In addition to selling the fleece and the animals, many alpaca owners operate a retail store selling alpaca end-products—either on or off their farms. Products are sold directly to consumers at their store or over the Internet. Many also sell alpaca products through craft fairs, farmers markets, and retail sites. Sales of these end-products can provide considerable supplemental income to alpaca owners.

Compared to sheep's wool, alpaca fleece is generally stronger, lighter, warmer, and more resilient. Finer grades of alpaca fleece, known commercially as 'Baby Alpaca,' are considered hypoallergenic, meaning they don't irritate the skin as other wools sometimes do. Unlike sheep's wool, alpaca fleece contains no lanolin, making it ready to spin after minimal cleaning. Prized for its unique silky feel and superb 'handle,' alpaca fleece is highly sought after by both cottage-industry artists (hand-spinners, knitters, weavers, etc.) and the commercial fashion industry.

Alpaca fleece has a great variety of natural colors, making it very much in vogue: 16 official colors (white; beige; three shades of fawn, three shades of brown, bay black, true black, and six shades of grey) with many other subtle shades and hues. White, light fawn, and light grey can be readily dyed, thus offering a rainbow of colors for the fiber artist. Alpaca fleece can also be combined with other fine fibers such as merino

Huacaya (wuh-KAI-ya)

Suri (SUR-ee)

Huacaya fiber with zig zag pattern.

Suri fiber showing straight locks

wool, cashmere, mohair, silk, tencel, and angora to attain incredible blends.

Some alpaca breeders will use those alpacas that do not adequately meet their requirements for desirable fleece traits for meat and hides. This is a new market and has not gained total acceptance by all alpaca breeders. Alpaca manure is also excellent for compost and increasing soil fertility.

Huacaya and Suri Fleece Types

There are two fleece types of alpaca, Huacaya and Suri. When they are shorn, the Suri and Huacaya look almost identical, but once their fleece begins to grow, they can be easily differentiated by their distinctive types of fiber.

When you examine a Huacaya fleece closely, you can see the individual fibers possess a wave or crimp. The fiber is soft to the touch and sticks out perpendicularly from the skin giving the animal in full fleece a rounded appearance similar to sheep.

A Suri's fleece parts down the middle of the back and hangs in long, silky, locks. The individual fibers are long and straight and the Suri fleece possesses a silky feel and shine that drapes on the animal in lustrous locks. Alpaca fleece and fiber will be discussed more thoroughly in chapter 14.

Are Alpacas Clean Animals?

Alpacas are much cleaner than most livestock, have minimal aroma, and tend to attract less flies in the summertime. Furthermore, alpacas often defecate in communal dung piles. There may be three or four of these areas in a pasture. This makes for easy clean-up, less odor, reduced opportunity for parasites, and better overall hygiene in the herd.

How Long Do Alpacas Live?

Alpacas live around 15 to 20 years. The longest documented lifespan of an alpaca is 28 years.

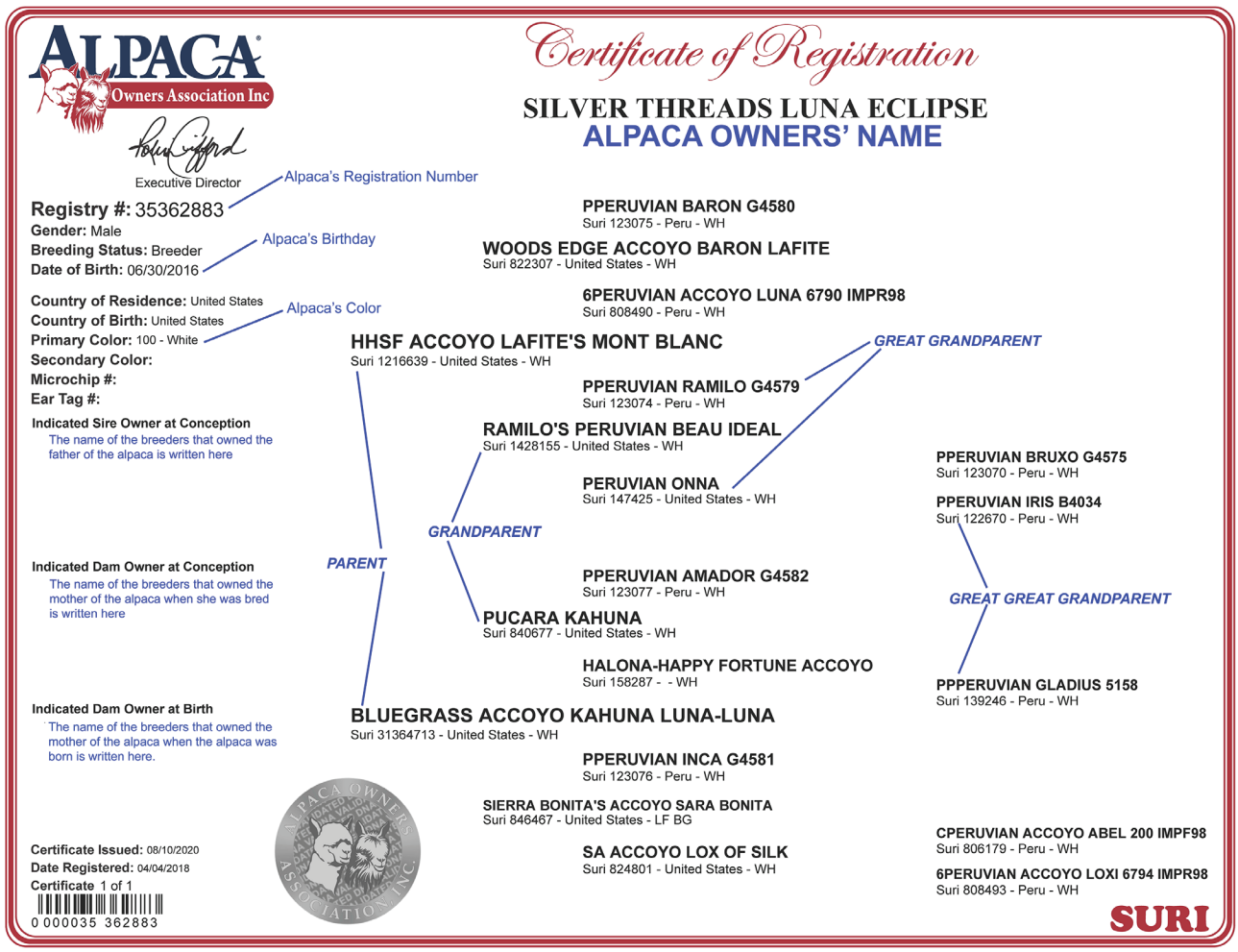
Are Alpacas Easy to Breed and Do They Birth Easily?

Alpacas usually are bred at 18 months of age or older. Typically, owners choose a specific herdsire that is brought to the female, but some farms will turn one herdsire out into a field with a group of females to mate with all of them over a week or two. Gestation or pregnancy takes approximately 330 to 365 days.

In most cases, crias (alpaca babies) are born without intervention, and usually during the first half of the daylight hours. Normally a cria weighs between 15 and 19 pounds and will be standing and nursing within 90 minutes of birth. The cria continues to nurse for about six months until it is weaned from its mother.

What Noise Do Alpacas Make?

Alpacas are usually very quiet which is an appealing characteristic if neighbors reside close to where they are kept. They are docile animals that make a minimal amount of sound. They do make a humming sound as a means of communication or to express concern or stress. Most communication between alpacas is nonverbal. Occasionally, alpacas will make a sound similar to a donkey's bray, known as an alarm call, to alert their herd to danger. Male alpacas also "serenade" females during breeding with a guttural, throaty sound called orgling. Lastly, male alpacas will make a screeching sound when they fight. Fighting can occur to establish dominance when competing for a female.



Is It Okay to Have Just One Alpaca?

No. Alpacas have very strong herd instincts and need the companionship of other alpacas to thrive, preferably three or more. Alpacas are livestock, and should not be treated as house pets.

Alpacas should be kept with their own sex with a few exceptions. One exception is that male crias need to be kept with their mothers until weaning. Gelded males should not be housed together with females, as they can repeatedly attempt to breed the females. This can lead to serious health consequences for the females.

Are Alpacas Easy to Train?

Alpacas are intelligent and relatively easy to train. It's best to start training them young so they accept a halter and learn to follow a lead. Many owners also enjoy training them to walk through obstacles. Some even compete in shows where alpacas walk over, through, and around objects, and also jump small hurdles.

Also, it is helpful to train alpacas to ride in a trailer or van if they ever need to be transported to a show or another farm. Alpacas are easy to transport, as they normally cush (lay down with their legs folded under them) when traveling. Be aware that alpacas should not be tied up when traveling. Chapter 15 provides more information about training.

What Is a Pedigree?

A pedigree for an alpaca is no different than a pedigree for a dog or other livestock. It is a record of an animal's parents, grand-parents, and generations of ancestors. The Alpaca Registry of the Alpaca Owners Association (AOA), maintains the pedigree database for alpacas in the United States and for some alpacas in Canada.

The AOA Registry requires that alpacas must have their parentage validated by DNA testing before an alpaca is permitted to be registered. The DNA of the dam and sire must match that of the cria before it is registered. Once this is accomplished, or after an alpaca is purchased, a new pedigree is issued in the new owner's name, and a certificate is sent reflecting that ownership, the alpaca's name, date of birth, and who owned the alpacas at the time of its conception, as well as its pedigree. The pedigree also indicates where an alpaca's ancestors were born. All the information contained on the pedigree can be very helpful when making decisions about breeding your alpacas.

To compete in AOA certified shows, alpacas must be registered by AOA.

What You Should Know

- **Alpacas are members of the camel family.**
- **Alpacas are originally from the South American countries Ecuador, Bolivia, Peru, Chile, and Argentina.**
- **There are four members of the Camel Family in South America. The Vicuna and Guanaco which are wild, and the Llama and Alpaca which are domesticated.**
- **Alpacas are raised primarily for their fleece.**
- **There are two types of alpacas distinguished by their fleece, Huacayas and Suris.**
- **Huacaya alpacas have fiber that has a zig zag pattern and sticks out from their body.**
- **Suri Alpacas have fiber that is straight and hangs in locks off their body.**
- **With proper care and shelter, alpacas are raised from Florida to Quebec and from Alaska to Maryland.**
- **Alpacas primarily eat grass or hay.**
- **Most alpacas are easy to train.**
- **Alpacas cannot live by themselves, they need at least one buddy — preferably more.**
- **Compared to other livestock, alpacas are easy to take care of.**
- **Alpacas generally live around 15 to 20 years.**
- **Alpaca babies are called crias.**
- **Alpaca pregnancies last approximately 330 to 365 days and it is rare for them to give birth to more than one cria.**

CHAPTER 3

Deciding to Work With Alpacas as Livestock

The Responsibilities and Commitment of Owning Alpacas

Committing to the care of an alpaca should not be a casual decision. Accepting the responsibility to have an alpaca should be thoroughly thought out, just as it is for a dog, cat, or any other livestock. The discussion should include all members of the family that might be involved at any time in the animals' care.

Alpacas need company and should never be kept alone. If you don't have similar livestock such as llamas, make sure to keep at least three or four alpacas together, as they thrive in a herd. Keep males and females separate to prevent unwanted breeding.

Minimally, alpacas require shelter from inclement weather, daily feeding, fresh water, and daily inspection to be certain that they are in good form. Other maintenance such as parasite prevention, toenail trimming, and shearing are required less frequently. Just like a child or pet, their needs must be met 365 days a year. Those needs do not go away for holidays, vacations, or owner illness.

Alpacas require adequate space and shelter that is safe and protects them from weather and predators. It is customary for alpaca owners, particularly those that are keeping their alpacas in smaller areas, to regularly rake or shovel their manure. This helps with the control of parasites and odor.

> Each alpaca has its own personality and if children are to be working with an alpaca, it is wise to choose one that is calmer and more cooperative.

Alpacas bring many years of enjoyment to their owners. Unlike many other livestock projects, most alpacas are kept for their entire natural lives, so it is important to plan for expenses that might be associated with any pet or livestock for its lifetime. With a lifespan that can reach up to 20 years or more, it is important for the family to consider that children grow up and their interests change. Will the family still want to be involved in caring for an alpaca for years to come?

Own or Lease?

If you are considering alpacas as an activity for your children, there are two options available. Obviously, ownership is one of these and commands a longstanding commitment as well as adequate shelter, space, and fencing. You can also purchase an alpaca and board or agist it at a farm or ranch. Another wonderful way of introducing a child to alpacas is by leasing an alpaca.

In the leasing arrangement, the alpaca may be leased and taken home to the family's acreage, or it may remain on the leasing farm where its daily care is overseen by the owners. Many owners are grateful for this second arrangement for the youth can assist them on a regular basis in caring for and training their alpacas. There are numerous ways to structure a lease, from the child that only works with the animals and does not help with their daily care, to a lease where the child is fully involved and is responsible for feeding, watering, and cleaning up after their alpaca daily as if it were their own.

Finding a Mentor

Many alpaca owners have no previous experience owning and caring for livestock. Taking the leap into owning alpacas will be easier if you have a mentor to help provide counsel should you need some advice. Often that might be the person you purchase your alpaca from, but it could be a farm that is closer or more willing to provide help to a new owner. A mentor can help to put a new owner in touch with resources such as veterinarians, transporters, shearers, or contractors for building fence. They can walk you through trimming nails, shearing day, skirting fleeces, tell you the best place to get hay or feed, or help with the birth of cria (baby alpaca).

Choosing An Alpaca to Purchase

If you are ready to own an alpaca, there are several things to consider before choosing an alpaca to own.

- **What Will the Alpaca Be Used For (fiber, fun, or breeding stock)?:** One of the wonderful things about alpacas is that they offer so many different experiences to take advantage of. They are intelligent animals that can be trained to lead and go through an obstacle course or even carry a pack. Their fiber can be used to make clothing, accessories, household

As with other animals it is important to build a good relationship with your alpaca based on trust.

furnishings, and artwork. Occasionally, they serve as guardian animals used to protect flocks of sheep. In many countries and to a much smaller extent in North America, their meat and hides are utilized.

- **Temperament:** Alpaca temperament varies from one animal to the next. Some of the temperament appears to be inherited from parents and a certain percentage is attributable to how the alpaca has been raised. Each alpaca has its own personality and if children are to be working with an alpaca, it is wise to choose one that is calmer and more cooperative. Like other animals it is important to build a good relationship based on trust. Even the alpaca that is initially shy and fearful can become a good partner for the child that is patient, kind, and willing to work regularly with the alpaca to increase its skill and confidence. It is suggested that you choose a calmer alpaca for the less experienced or smaller child.
- **Assessing the Fleece Characteristics:** If you are interested in having your alpaca to use its fleece for fiber arts, you will want to pay close attention to the quality of the fleece. It would be wise to seek input from someone who has some expertise in alpaca fleece before making your purchase. You might request a fiber test called a histogram to help with your decision. (Refer to Chapter 13 for more information about fleece.)
- **Assessing Conformation:** Selecting an alpaca with correct conformation is important to be certain that your new alpaca will live a long, healthy, and comfortable life. If you are choosing an alpaca to breed, be certain that it is as correctly conformed as possible so that the offspring it produces are more likely to be sound. (See Chapter 12 where we discuss correct conformation.)
- **Consider a Veterinary Examination:** The decision to purchase livestock is a big one and you certainly do not want to purchase an alpaca if it already has problems. Having a veterinarian examine a potential purchase might be money well spent, especially if your alpaca is going to be used for breeding. These are called pre-purchase exams.
- **Why is Registration Important?:** The Alpaca Owners Association (AOA) is responsible for maintaining a registry database for alpacas in North America. The AOA registry accumulates information about all the alpacas in its registry. One obvious and important purpose is to maintain records that show the lineage of registered alpacas on forms called Pedigrees.

The AOA registry is different from many other livestock registries. First, the parents must be registered before their offspring can be registered. Strict rules demand that all alpacas in the registry have their lineage validated through special DNA blood testing. DNA testing validates the mother and father of an alpaca.

When breeding alpacas, owners usually choose which male and female to breed together to

improve the fleece and conformation (body structure) of the next generation. Without an accurate registry, the breeder cannot be as certain that an alpaca's parents are who they think they are. There have been many incidents where it has been discovered that a cria's parent (typically the sire) is different from who the owners initially thought. These incidents have proven the importance of DNA validation.

AOA also runs the largest alpaca show system in the world. Individuals come from all over the world to train to become AOA Certified Alpaca Judges. Only alpacas that are registered with AOA can compete in AOA shows.

Youth may participate in county fair or non-AOA shows with unregistered alpacas, but many youth clubs enjoy competing in both. AOA tracks the show winnings of alpacas when they compete in AOA shows and places that information in the records for that alpaca with their pedigree.

A special program called Estimated Progeny Differences (EPDs) uses fiber data from histograms to track how well a male or female passes fiber traits onto its young. The AOA Registry also tracks that data.

Registering alpacas increases the value of that animal. Only alpacas that are born to AOA registered alpacas, validated by DNA testing can be registered by AOA. If a child or their family are considering breeding alpacas or showing them in AOA shows, it is best to use registered alpacas.

Contracts

Contracts are legal documents that are agreed upon by at least two people or businesses. Many different types of contracts exist in the alpaca industry. A contract helps to define exactly what everyone is obligated to in terms of payments or work, so that everyone understands the expectations they have of each other.

- **Purchasing Contract:** This is simply an agreement that defines who is selling, who is buying, which alpaca(s) is being bought, how much is to be paid, and when and how the payment(s) is to be made.
- **Breeding Contract:** Sometimes people choose to breed their alpaca to someone else's alpaca. This contract defines the price of the breeding, who is responsible for veterinary bills associated with the breeding (if there are any), who is responsible for transportation, and if there is board to be paid. Often breeding contracts will include certain guarantees, such as a live birth of the cria.
- **Boarding or Agisting (another word for boarding) Contract:** Sometimes an alpaca owner is unable to have their alpaca stay with them and needs it to live someplace else. In this case it is wise to have a boarding or agisting contract developed for the alpaca owner and the farm or ranch owner who will take care of the animal for them. This contract will define the price of such care and what might be included in that board, such as shots to prevent certain parasites, shearing, birthing fees, veterinary fees, and when to call the veterinarian.
- **Leasing Contract:** Often alpacas used by youth for showing or club projects are leased from alpaca farms/ranches. These contracts define the fees and expectations of the alpaca owners and the youth. The lease may be to take the alpaca to the youth's farm for a specified amount of time, or the alpaca may remain on the owners' farm. They may specify many things such as the child is to work

at the owner's farm a certain number of hours per week, that the youth is responsible for the care and upkeep of the alpaca including veterinary expenses, or that the owners will be responsible for transporting alpacas, etc.

Because there is so much variation in the arrangements made to allow young people to work with alpacas, it is best if everyone involved knows exactly what is expected to avoid any potential for any misunderstandings.

Transporting

Because alpacas are smaller in stature than some livestock, transporting them does not necessarily require a livestock trailer. When transporting, it is important to consider the safety of the alpacas as well as their transporters.

There are professionals who transport alpacas in all parts and to all parts of the country. They charge a fee for their service and have special requirements, such as veterinary evaluations to be certain the alpaca is healthy and will not spread a contagious disease to the other alpacas on the trailer.

The United States Department of Agriculture (USDA) provides the following "Golden Rules" for transporting alternative livestock such as alpacas:

- Ensure that only healthy animals are transported.
- Minimize contact of your animals with other livestock and wildlife.
- Consult your veterinarian.
- Comply with state and federal regulations regarding:
    1. The transportation of your animals.
    2. Health certificates and permits.
    3. Ventilation, temperature, and environmental requirements.
    4. Nutritional requirements.
    5. Shipping and holding space and other welfare requirements.

Each state's Department of Agriculture or equivalent agency will have regulations and guidelines for transporting animals. Visit their website or contact them directly. Please note that the state receiving the animals is the one that sets the entry requirements.

Livestock traveling from one state to another are required to be examined and certified healthy by a licensed veterinarian before the trip begins. Traveling across state lines requires that you have paperwork signed by a veterinarian, so before traveling, be sure you have plenty of time to schedule the veterinarian appointment and acquire these "Vet Papers." Usually, owners can transport alpacas within their state without any need for papers or veterinary inspections. However, the venue or event that your alpaca is going to may have special requirements of its own, even if it is occurring in the same state where your alpacas live.

Alpacas can be transported in horse and livestock trailers, or even passenger vehicles when special precautions are taken. Many breeders have used cargo vans, SUVs, or mini vans. Obviously, livestock trailers are a great choice because the driver will not be bothered

photo courtesy of The Farm at Krystal Acres

when alpacas need to urinate or defecate. They are also built for easy loading and unloading.

Using vans or SUVs to move alpacas requires some added care. First and foremost, there should be a sturdy barrier that prevents the alpacas from coming into the front seat. It is also recommended that some type of tarp or other protection be placed under the alpacas to prevent urine or manure from soiling the vehicle. Loading alpacas onto trailers with a ramp, or small step is relatively easy, but getting them into a taller vehicle can be a challenge that will require additional help or ingenuity.

Regardless of the method you choose to transport, it is important to consider ventilation for adequate cool, fresh air in the warmer months, and protection from cold or damp weather in the winter months. If the distance is greater than an hour from home, it would be good to have fresh water available, and hay if the trip will last for longer than a couple of hours. Be prepared to cope with delays from traffic or road construction. Have properly fitting halters and leads for each alpaca in case it is necessary to have them exit the trailer or vehicle along your route.

Always carry the contact information for your destination with you as well as an accurate and detailed map, for some farms and ranches are in areas without cellular/GPS service.

CHAPTER 4

Deciding To Have An Alpaca Fiber Arts Club

Alpaca Fiber Introduction

This section is intended to assist Youth Leaders and Parents who want to make the use of Alpaca Fiber the focus of their club. The information included here can also be used by those that are working with alpacas as livestock.

We ask that you read ***Chapter 1: An Introduction For Leaders And Parents*** thoroughly to provide you with the many considerations of running any club for youth. This chapter will focus on the special considerations and activities that involve alpaca fiber. Certainly, a club can focus on both the alpaca as livestock as well as the fiber, but be careful not to "bite off more than you can chew", especially if this is the club's first year

It is encouraged that Leaders, Parents, and Youth Club Members also read ***Chapter 4: What Is An Alpaca***. It provides background information about alpacas that will help the fiber enthusiast understand where alpaca fiber comes from. Fiber Arts Club members should be responsible for knowing at least the basics that are included at the end of that chapter in the "What You Should Know" insert.

Additionally, Leaders and Youth Members should familiarize themselves with ***Chapter 14: The Alpaca Fleece***. In this chapter information is provided about the anatomy of the skin, analysis of fiber, processing alpaca fleeces. ***Chapter 15: Using Alpaca Fiber*** is also essential for it discusses the many ways alpaca fiber may be

Alpaca fleece to shawl competition

used. Much of the information contained in these two chapters would be appropriate material to include in testing Youth Members about their knowledge of alpacas and their fiber.

Starting An Alpaca Fleece and Fiber Oriented Club

Organizing any youth group takes time and commitment, not only of the Youth and Leaders, but also of parents. All need to take responsibility to understand the purpose and activities of the club. It is suggested that a calendar be created to ensure that all are aware of the expectations to begin and conclude projects, as well as to guarantee maximum participation in any events or field trips.

It is also possible for your club to be a part of another club. There are 4-H groups that include many species of livestock and many different activities beyond livestock such as sewing, baking, or photography. The advantage of being part of another larger club is that they have Leaders that are already experienced in the workings of 4-H or FFA and can help guide you on having your club participate in your county fair or 4-H and FFA in general.

Remember that 4-H and FFA may have special requirements of Leaders to ensure the safety of the club members. These requirements might include criminal background screening, leader training, an interview, keeping specific paperwork, and working closely with the agent in charge of programs in your area. Even if you do not wish to become part of a 4-H or FFA, there is wonderful material available online to take advantage of to help guarantee the success of your club.

Some fiber art clubs might focus only on one fiber art such as knitting, while others may want to delve into many different types of fiber arts. This may be predetermined by the interests of the Leader. If you have never led a youth group before, it may be wise to limit the scope of the club so that you and your members are not overwhelmed or disappointed if you do not get to accomplish something on the schedule.

It may be best to initially start with fiber art projects you feel comfortable with, rather than enter an area you have no experience in. Perhaps just 1 or2 types of fiber art would be enough. One could be knitting a scarf and the other felting coasters. Or your club could be totally devoted only to weaving.

Many clubs begin at the start of a new year and end after their local county fair, but the length and timing for your club is up to those who lead and participate in it.

Capabilities

We all know that attention span, coordination, and ability to stick with any project varies from child to child as well as from third grader to high school senior. It is important that working with fiber be fun, not drudgery, and it would be wise to create some flexibility in the club so children that may not be interested in working on some type of fiber art can try something else.

It is suggested that the meetings be divided into two parts, one for education about some aspect of alpaca fiber and the second half to work on a fiber art project. There is a chapter devoted to fleece and fiber, as well as a Workbook for Alpaca Fleece. We encourage Youth Leaders to take advantage of these two sections of the Handbook to enhance club members understanding of where alpaca fleece comes from, how it is processed, and what qualities alpaca fiber possesses.

Weekends are a great time to meet for they allow for longer meetings. You could even schedule your club meetings for every other week. Meetings in the evenings after school can be difficult after a long day at work or school and homework to do.

The fiber arts that are introduced and practiced by the students must be age appropriate. Felting is appropriate for all ages, although needle felting may not be something you want to pursue with younger kids.

Budgeting

It is important to plan your club projects to be able to achieve an accurate schedule of fees. If your club will only be doing crocheting or knitting, the costs will be much smaller than those associated with weaving, and you can have the club members purchase their yarn and needles.

If you are planning on doing felting projects, you may have to purchase the fiber in advance for it may not be readily available in your area. Weaving projects require small looms. These can be purchased in advance and be a part of your club fees, or you could purchase them and lease them to members. If your area has guilds (guilds are groups of individuals pursuing a common art), it may be possible to contact them to lease equipment or provide instruction.

Whatever the activities you choose to pursue with your members, it is important that you plan well, anticipate expenses, and be certain that those expenses are explained and covered by your club fees.

Resources

This Handbook includes a section listing resources to assist Leaders, Parents, and Youth Members with their alpaca endeavors. There are hundreds of books and websites that provide information. Don't forget to investigate what might be available at your local library. Because what is available on the internet changes so rapidly it is difficult to keep such a listing current. Internet searches are an excellent way to obtain more information about a topic, but there is also an accumulation of information available on the AOA website.

YouTube is an excellent resource for those interested in fiber arts. There are thousands of how to videos demonstrating techniques for beginners to experts. YouTube videos can also demonstrate different approaches to the same fiber art and if a Leader does not feel confident in a fiber art and is unable to find an artist to assist with instruction, these videos can be very helpful.

There are several Facebook groups that relate to alpacas and many groups focused on fiber arts. We have found that the members of these groups are anxious to help and are a wonderful resource to answer questions or can direct you to where you might find answers to your questions. Remember though that these individuals may or may not be the experts you are looking for, so use critical thinking before you accept and utilize their advice.

A Suggested Schedule of Meetings

Clubs typically meet weekly at the same time each week. Meeting on a Saturday or Sunday allows for longer meetings with all participants less tired from a day at school or work. When planning your schedule be aware of school vacations and holidays.

- **Introductory Meeting:** Here everyone meets one another, contact information is exchanged, and the calendar is reviewed.
- **Review of Alpaca Fiber:** At this meeting the two types of alpaca fiber can be demonstrated (suri and huacaya). One or two types of fiber art are introduced and demonstrated.
- **Review of the shearing process:** Another one or two types of fiber art are introduced and demonstrated.
- **Demonstration of skirting an alpaca fleece:** Fiber art activity.
- **Explanation of a histogram:** Fiber art activity.
- **Overview of alpaca fiber processing and terminology:** Fiber art activity.
- **Spinning demonstration:** Fiber art activity (drop spindle spinning would be excellent).
- **Dyeing alpaca fiber:** Fiber art activity (Kool-Aid dyeing would be excellent)

Field Trips

In addition to regular scheduled meetings, field trips can be a fun extension of your club's activities. Some field trips to consider:

- Visiting an alpaca farm on shearing day. By visiting the AOA website you can locate alpaca farms in your area. Shearing occurs annually in the spring.
- Visit a fiber mill. Most fiber mills will schedule a group tour. This is a great opportunity for your members to see all of the different steps in the process of converting alpaca fiber to yarn.
- Attend a fiber gathering or festival. Throughout the year there are fiber fairs held across North America. These are great opportunities for youth to see all the possibilities for fiber arts and to acquire new ideas and materials.
- Attend an alpaca show. AOA affiliates hold alpaca halter and fleece shows and there may be one close to you. The AOA website maintains a list of all upcoming certified alpaca shows.
- A visit to an historic village can also show how fiber arts played a tremendous role in historic times. Knowledge of fiber arts helped to clothe the family and decorate the home.

Collaboration

There may be opportunities in your area to collaborate with other groups. Art centers may already have fiber arts classes. Perhaps you can work with them to offer more opportunities to your club members. Perhaps they would be willing to share equipment or provide some instruction, space for your meetings, or artists to speak or instruct at a club meeting.

Many alpaca owners are also fiber artists. They may be willing to help at your meetings, provide materials, or host meetings or activities.

As mentioned earlier, there are many guilds that can also serve as a resource. There are weaving, knitting, spinning, and needlepoint guilds across North America, and a simple internet search will help you locate those in your area. Their members are passionate about their craft and are willing to see others learn, participate, and perpetuate their fiber art.

Schools are a great place to hold meetings. If you are looking for safe and convenient meeting locations, your local school district may be a great place to start.

Projects

Chapter 19 provides many simple fiber arts projects. For budding Fiber Artists, it's best not to overload them with too much at once. Perhaps one club year you will focus on a felting project and crocheting a hat. The next year you might want to tackle something more advanced such as needle felting and a more advanced crocheting project. Or introduce another fiber art altogether such as needlepoint or weaving. The possibilities are endless!

Opportunities to Benefit Your Community

A valuable lesson for your club members is be to give something back to their community. Club members using their newfound skills in fiber arts might be a great way to do this. They can also do activities to benefit their club and offset some of their expenses. Many clubs run bake sales or garage sales to raise money for their club or some special community effort.

The club members could knit hats and scarves for the homeless, raise funds for a soup kitchen, or knit squares to sew together to create lap robes for nursing home residents. They could do a clothing drive, donating their outgrown clothes (with parental permission) to a relief organization. Alpaca selfie booths are very popular. Taking an alpaca to a location where people can take an alpaca selfie for a small fee is a popular way to raise money.

There are many ways in which your club members can experience the warmth and goodwill of giving their time and talent to others. Reaching out positively to your community is also a great way to spread the word about fiber arts, recruit new members, and introduced others to alpacas and their fiber.

CHAPTER 5

Housing and Fencing For Alpacas

Introduction

Any discussion about housing and fencing alpacas in this handbook will be general, as the seasons and climate can vary widely across the country. In their native South America, alpacas live in a mountainous region near the equator. Although there are seasons, their proximity to the equator moderates the climate, which is typically dry. Alpacas graze over large areas, and shelter and fencing are usually not provided.

In North America, however, you must provide both shelter and fencing. A valuable investment is visiting various alpaca farms in your area to see how different owners have set up their facilities. Ask questions to learn what has worked best for them. The AOA website offers educational material, and several alpaca-oriented groups on Facebook can provide assistance. Use these resources to leverage their experience, avoid mistakes, and design the best possible spaces for your alpacas within your budget.

Shelter

Because all parts of North America have extremes in weather, some type of shelter is essential to keeping alpacas safe and healthy.

The reasons for shelter are simple:

- Protection from cold and wet weather
- Protection from hot weather
- Protection from predators
- Protection of food so that it will not get spoiled by the elements

You probably already know that alpacas do not eat other animals. They are not predators. Instead, alpacas are "prey animals." In other words, they can be attacked and eaten by other animals such as dogs, bobcats, wolves, coyotes, bears, and lions. Because they are prey animals, the herd is always interested in keeping a watchful eye in as many directions as possible to spot anything dangerous and to avoid being attacked. For this reason, alpacas prefer not to be enclosed inside a building. They would rather rest in shelters that are more open and offer the best view of the area surrounding them. Alpacas are more at ease if they can stay together as a herd, so separating them in stalls is not appropriate except to isolate a sick or injured animal.

Many alpaca owners have built beautiful barns to house their alpacas who then choose to spend their time outside of the barn, under the overhangs or out in a pasture in the shade of a tree. Occasionally, alpaca owners purchase properties that already have livestock buildings on them. In this case they can modify the shelters to accommodate their alpacas.

In your planning, be certain to also consider where you will store feed and hay. Feed needs to be protected from vermin *and* the alpacas, and hay needs to be kept dry to avoid spoilage.

Some shelter types for alpacas are:

- Simple canopy with no sides (more appropriate for the south)
- Less permanent shelters created with panels or poles and tarps

- A shed with three sides closed and the fourth side open to allow free movement in and out
- Hoop or greenhouse style structures with tarps suspended over pipe arches
- Barn with overhangs that allow the alpacas to be outside but sheltered from sun or wet weather
- Pole barn
- Older barn that is modified (if necessary) to house alpacas

Shelter Placement

The shelter should be positioned so that water falling from its roof and run off from the surrounding land will move away from the building. The shelter opening should face in a

direction that provides the best protection from bad weather. In the Midwest, the coldest winds and weather come from the north and west, so the best place for shelter openings is to the south and east. This position also allows the alpacas to shelter in the winter with the low winter sun beaming in under the eaves of the barn.

Shelter Flooring Material

Just as there are many different types of shelter, there are many different types of materials that are used for flooring them. Things to consider when deciding about flooring

- How will it affect the health of the alpacas?
- How easily can it be cleaned?
- How expensive will it be?
- How will it affect the quality of the fleece at shearing time?

Dirt flooring is the least expensive and can be replaced easily by digging it up and adding new soil. Sand flooring is not appropriate for alpacas for it can get into their fleece (which will dull the shears) and if the alpacas accidentally eat it, they can get sand colic. Cast concrete pavers provide a good surface to make clean up easier and can allow some of the urine to drain between them. The pavers can be lifted and moved to allow urine soaked soil to be removed from underneath and then placed back in position. Pavers are less expensive than concrete which is the most expensive option. Concrete is easier to clean, but does not allow urine to drain, so the floor must be cleaned regularly. If alpacas are housed on concrete, something must be placed on the floor to absorb the urine such as straw or recycled cardboard pieces.

Often, straw is used on top of flooring for bedding to help provide comfort and insulation between the alpacas and the cold ground in colder weather. Recycled cardboard is also used. Sawdust or wood shavings are not a good option for alpaca bedding because they will stick to the fleece, lowering its quality at shearing.

Fencing Options

For alpacas, fencing should be at least five feet high for safety, as they can jump over a four-foot fence, especially males seeking a mate. Some owners use five-foot perimeter fences and four-

Woven Wire (left), High Tensile (middle), and Electrified Tape (right)

foot interior fences to divide pastures.

When choosing fencing, consider that alpacas have long necks that can get them into trouble with certain types of fencing. While they don't usually try to go through fences, they will reach through to browse grass on the other side. Therefore, fences with gaps large enough for an alpaca's head to fit through are not recommended.

Fencing materials vary in quality, so it's crucial to choose a knowledgeable and experienced dealer or installer. Since fencing is a significant and long-term investment, request references and compare multiple bids. Here are some types of fencing to consider:

- **High Tensile Fencing:** This is one of the least expensive types of fencing and is readily available. It consists of very strong wire strung between wooden posts. Because it must be kept very taught, it requires strongly braced corner posts with wooden posts spaced at least every 24 feet. The spacing needs to be closer between wires to prevent the alpacas putting their heads and necks through and for their protection it needs to be electrified. ***There have been several deaths from alpacas getting their necks caught in high tensile fencing. Their long necks allow them to become entangled. Therefore use of High Tensile is not recommended.***
- **Electrified Tape:** This option is very similar to high tensile, but is not as strong and will not last as long. It is easier to install. Alpacas are more likely to get tangled in electrified tape because it is more flexible and not strung as tightly. It is not as effective at keeping predators out. Some breeders will use electrified tape to divide inner pastures. There are different brands, types, and widths of electrified tape. Consider visibility for both the alpacas and humans to avoid accidents. It is also wise to post signs alerting people not to touch the fence.

- **Welded Wire:** This fencing is made from wire welded to create varied spaces in different heights. Most will use the two inch by four inch spacing, which makes it very safe for alpacas. This fencing is not as durable as some other fencing because it is inclined to rust at each joint where the wires cross and are welded. This can lead to wires sticking out which can be hazardous to livestock.
- **Woven Wire:** This fencing comes in various heights and styles. The traditional farm fence often has openings large enough for alpacas to stick their heads through, creating a potential hazard. However, the "no climb" version features openings only two inches wide, which prevents alpacas from getting their heads through. Many alpaca owners prefer this safer option.
- **Board Fencing, Vinyl Rail, and High Tensile Polymer Rail:** Wooden board fencing is expensive but visually appealing. Vinyl and high-tensile polymer rail options look similar but cost less and are easier to maintain. However, none of these types are ideal for alpacas as they do not protect against predators. The gaps between the rails are large enough for dogs or coyotes to pass through or dig under.

Remember the Gates!

The placement of gates can make a tremendous difference in the ease of handling your alpacas and working in your pastures. Some farmers feel that you can never have too many gates! Remember to make your gates alpaca and predator proof.

Plan a Catch Pen

From time to time you will need to handle your alpacas. Very few alpacas are willing to allow someone to walk up and halter them. This will require you to herd them into a space small enough that you can catch and restrain them. Some farms will make a catch pen in the corner of the pasture or in the barn. It is very helpful if you regularly give the alpacas their food or treats in this area so that they will willingly go there when you need them to.

What You Should Know

- **Alpacas require adequate shelter placed to protect them from the weather.**
- **The shelter needs to provide approximately 18 square feet per alpaca (3' X 6').**
- **As prey animals, alpacas prefer to be able to see around them and will sit under the eaves or at the opening of the barn instead of inside.**
- **Wood chips are not good flooring because they get into the fleece and spoil the fleece and anything made from it.**
- **Fencing needs to be at least five feet high and have spacing small enough to keep an alpaca from being able to stick its head through.**
- **Gates need to be predator proof and prevent alpacas from sticking their heads through.**
- **A catch pen makes training and husbandry much easier.**

CHAPTER 6

Husbandry or Alpaca Care

photo courtesy of Plumeria Alpaca Ranch

Introduction

This chapter will cover those things that don't quite fit into another section but still need to be discussed. In some dictionaries, husbandry is defined as the scientific management of animals or plants. The word implies that there is more to taking care of alpacas than simply feeding them, providing clean water, and a place to shelter and graze. It suggests that one must understand more about their animal to anticipate what more it may require, to train it, and to make best use of its product, its fleece.

Although this chapter discusses various issues that can arise with alpacas, keep in mind that they are generally hardy and healthy livestock to manage. They are easy on the pasture because of their softer foot, they defecate (poop) in specific areas that make them less susceptible to parasites, they do not challenge fences, they are efficient utilizing food, and they get along well with each other. Because they are smaller than cattle and horses, they are easier to handle, and they are smart, which makes them easy to train.

Choosing a Veterinarian

Before you bring your alpaca home to your farm, you should have already contacted a veterinarian who is willing and able to take care of alpacas. Because they are an alternative livestock, some veterinarians may not have experience, or may not be willing to have your animal as a patient. You can find a veterinarian by visiting your state veterinary association website, or by asking other alpaca owners in your area who they use for their alpacas' veterinary care.

Veterinarians are there to help advise you about any extra care your animal might need. They can be called in emergencies to help with

an illness or injury, and they can help with an alpaca birth if there is a complication. They can do blood tests to see if there is an infection or anemia, check alpaca feces to see if there are too many parasites, and they can prescribe medications if your alpaca needs them.

Always have your veterinarian's name and telephone number prominently displayed in your alpaca shelter, and on you or your parents' cellular phone.

Reasons To Call the Veterinarian

In the third edition of his ***Alpaca Field Manual***, C. Norman Evans, D.V.M. lists the following reasons to put a call into your veterinarian.

- Any animal with ataxia (walking as though they are drunk), the inability to coordinate movement.
- Any animal with seizures.
- Any animal that cannot rise.
- Any adult diarrhea present more than 24 hours.
- Any cria diarrhea present more than 12 hours.
- Any pregnant female uncomfortable more than two hours or experiencing more than one hour of labor.
- Any animal drooling or vomiting saliva more than 45 to 60 minutes.
- Any animal with temperature over 103.5 or pulse greater than 100.
- Any female that lies on her side or bleeds after breeding.
- Any female that is not pregnant after three breedings
- Any animal that does not eat for two days or has rancid breath.
- Mother that birthed and has no milk.
- Newborn cria that cannot stand after two hours.

Alpaca Vitals

Vitals refers to the numbers for pulse, heart rate, and respirations (breathing rate). The values below are considered normal and any numbers higher or lower could indicate something is wrong with your alpaca, especially if they are accompanied by behavior that makes you think something is wrong.

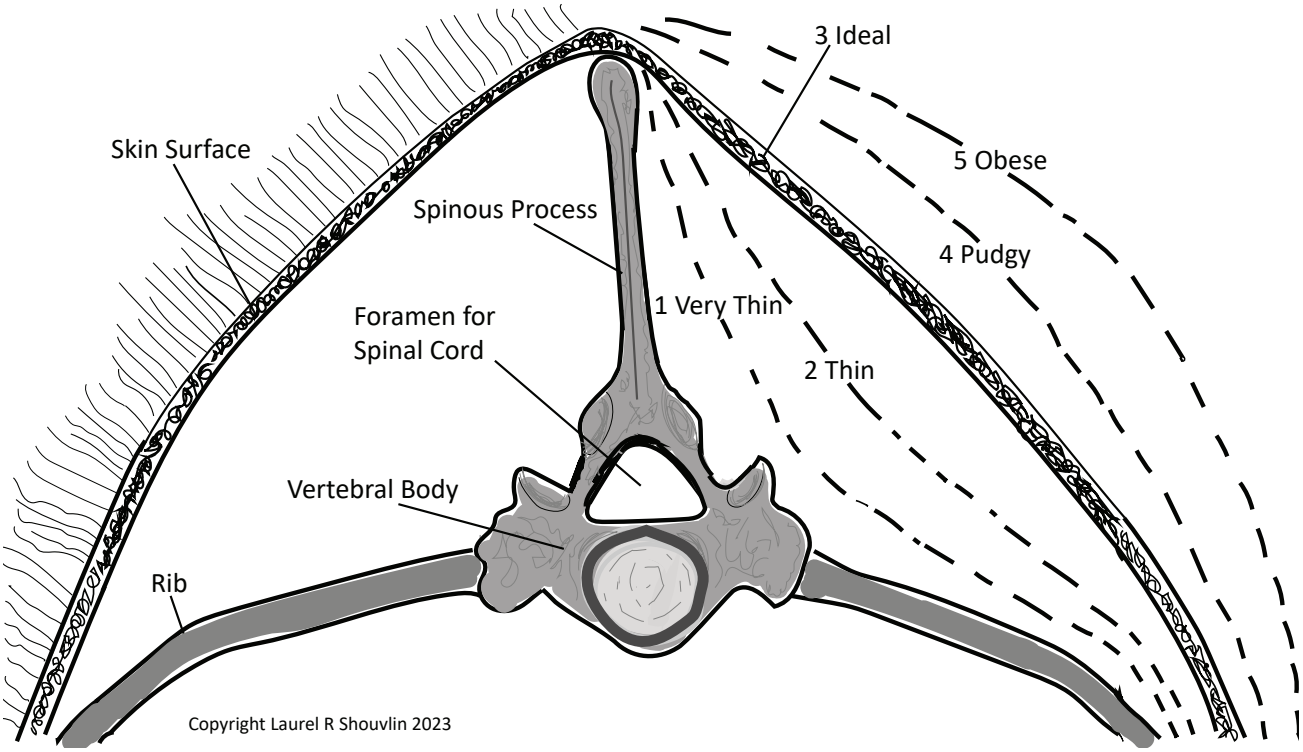
An alpaca's normal temperature is 99 to 100.2 degrees Fahrenheit. An adult alpaca has a normal pulse of 60 to 80 beats per minute. You must use judgment, for if the pulse is high and you have just chased it around to catch it, that could explain the rapid pulse. A cria's pulse is going to be faster. A normal cria pulse is 70 to 90 beats per minute.

A normal alpaca respiration (breathing) rate is 20 to 30 breaths per minute

Nose to Toes

One should be familiar enough with alpacas and specifically their own alpaca, to be able to tell when they are not feeling well, or are losing weight, or gaining too much weight. The alpaca caregiver should understand all the things necessary to take care of their alpaca and where to find additional information and help if it becomes necessary.

One of the best and most relaxing ways to get to know your alpaca is simply to spend time with them out in the pasture. Simply observing them as they graze and interact will reveal their personalities, how active they normally are, who is the herd leader, and how they are feeling. You will watch how they move so that you will be able to tell if their gait is off due to an injury. You might observe that the alpaca that



There are three locations to body score your alpaca. The above sketch represents the area above the alpaca's shoulders. The other location is to feel over the ribs. You should be able to feel the ribs, but they should not be prominent. The last location is to view the alpaca from the rear. If the alpaca's thighs rub together, it is too heavy, if the things are narrow, the alpaca is thin.

normally grazes constantly is just picking at the grass or hay, or not eating at all. This contact with your animals will make it much easier to acquire that "sixth sense" that something isn't quite right with one of them, or if you are breeding alpacas, it can let you know that a pregnant dam is in early labor.

Take a Closer Look

Every day, you should get a quick look at your alpacas from head to toes to tail. Check the head to be certain that the eyes are clear and the ears are upright. Look at the lower jaw to be sure there is no swelling. Watch them walk to be sure that they aren't limping or weak. Look at the tail end to be sure there are no signs of diarrhea.

Alpacas usually lay down so that their legs are tucked underneath them. We call this the cush position or cushed for short. If your alpaca is laying on its side, make sure that it is simply sunning itself and doesn't have a tummy ache or something more serious affecting it. Look at the belly and make sure that it is not bigger and rounder than normal.

Body Scoring

As you have learned from your parents and schooling, you don't want to be too fat or too skinny, you want to be "just right." The same is true with alpacas. Alpacas can hide their weight with the fleece they wear, so we do body scoring to tell if an alpaca is "just right."

This test requires that you have someone hold your alpaca or keep it still by holding it with a halter and lead. Place your hand on the withers of the alpaca with your thumb on one side of the spine and your fingers on the other side. If the space between the

tip top of the spine and the ribs is caved in, the alpaca is underweight. If the space between the tip top of the spine and ribs is rounded up, the alpaca is overweight. If the space between the tip top of the spine and the ribs is just right, neither in, nor out, the alpaca is in good body condition.

Rubbing your hands over the rib is one more way to confirm the body condition of your alpaca, however it might be a little difficult to feel the ribs if the alpaca is in full fleece. You should be able to feel the presence of the ribs, but they shouldn't be prominent.

Another place to look at body condition is in the upper part of the back legs of the alpaca. An underweight alpaca will have very thin thighs. A very fat alpaca will have very fat thighs that almost rub together. This is easiest to see when you look at an alpaca from behind.

Parasites

Parasites are an important husbandry topic. Chapter 12 is devoted to parasites with extensive information on their prevention and treatment. All alpacas have parasites, just as humans normally have bacteria in our digestive system. There are a few parasites that an alpaca absolutely should not have at all, and occasionally stress can cause a parasite "bloom "or imbalance that needs to be addressed. If you notice that your alpaca is not acting normal or is losing weight, doing a fecal test where the alpaca manure is examined under the microscope, is one of the first steps in diagnosis.

There are three excellent ways to control or eliminate parasite problems:

- Eliminate/reduce stress on your alpaca
- Keep manure piles cleaned up
- Provide a good quality hay, pasture, and supplements

Shearing

Shearing is the act of cutting the fleece off the alpaca. This fleece is your harvest or crop and represents the culmination of your efforts throughout the entire year. Alpacas are typically shorn once a year in the spring. Some owners choose to shear their alpacas themselves, while others hire a professional to do the job.

The shearing can be done with scissors, hand shears, or electric shears. The alpaca must be restrained to shear them. For the best behaved alpacas, you might be able to just hold them using a halter and lead, but owners are more likely to use either a shearing table or lay their alpacas on the ground and restrain them with ropes.

Some alpacas will be very cooperative and allow the process to occur without making a sound and others will scream and spit the entire time and then get up when all is finished and walk calmly away.

Many new owners may not realize that you need to schedule shearing months in advance. Professional shearers often travel from farm to farm and aim to make their routes as efficient as possible to save time and fuel.

Ask local alpaca owners for recommendations on shearers and contact them in January or February to secure a spot on their schedule. Most shearers plan appointments early in the year.

An experienced shearer will provide you with the best fleece from your alpaca.

- They will have a routine that keeps the coarser fibers out of the blanket (the best part of the fleece).
- They will have very few second cuts (these occur when the shearer cuts the same fiber twice and are undesirable for processing your fleece).
- They will not injure your alpacas by cutting them with the shears.
- They will work efficiently and quickly to have your alpaca in the ropes for as short a time as possible.

To ensure the safety of everyone, it is important to be organized and prepared for your shearing day. Here is a list of what you might need.

- **A clean space to shear.** It is important that your alpaca's fleece remain free of dirt and contaminates. A space that is free of hay and dirt is essential. Most will put down mats to make it more comfortable for the alpaca and to make cleanup easy between animals.
- **Electricity** is essential to run the shears, lights and even the vacuums that may be used to clean the shearing area between alpacas.
- **Good lighting.**
- **Bags** for putting the fleece in.
- **Syringes, needles, and drugs or immunizations.** Because the alpacas are already restrained, many owners choose to give shots at this time.
- **Toe nail trimmers.** This is a great time to give your alpaca a pedicure!
- **Teeth trimming.** Because the alpaca is already restrained, this is a great opportunity to take care of trimming teeth.

Dental Care

Alpacas have three different types of teeth:

- **Incisor teeth** only occur on their forward, bottom jaw. Cattle, goats, sheep, and deer are the same way. The bottom teeth are used for grazing - cutting the grass as they pinch it between their teeth and upper gum. These lower incisors should align correctly with the upper gum, but sometimes they don't, and the teeth then need to be ground or cut so that they do not get too long. Incisors continue to grow as the alpaca gets older. Alpacas have baby teeth too! Alpacas have two sets of incisors and lose their first set when they are two years or older.
- **Molar teeth** are in the back of the mouth and occur on both the upper and lower jaw. These teeth are used to chew the cud or ruminate. They are responsible for grinding the food into smaller and smaller pieces for best utilization by their digestive system.
- **Canine teeth** are located on both the upper and bottom jaws between the incisors and molars. They do not begin to appear until the alpaca is at least one year old. There can be more that one canine

on the top and bottom of each side. Males will try to bite other males, and because these can be quite sharp, it is important that they be trimmed. Females can have canine teeth, but they do not use them to harm anyone, so they do not need to be trimmed. An alpaca can have two or three sets of canine teeth that erupt as the alpaca ages. It is important to check males for new canine teeth each year until they are five or six years of age.

The tools to trim alpaca teeth differ depending upon which teeth you are trying to trim. To keep the mouth open and prevent cutting gums or tongue, an object such as a dog's rope chew toy is inserted in the mouth.

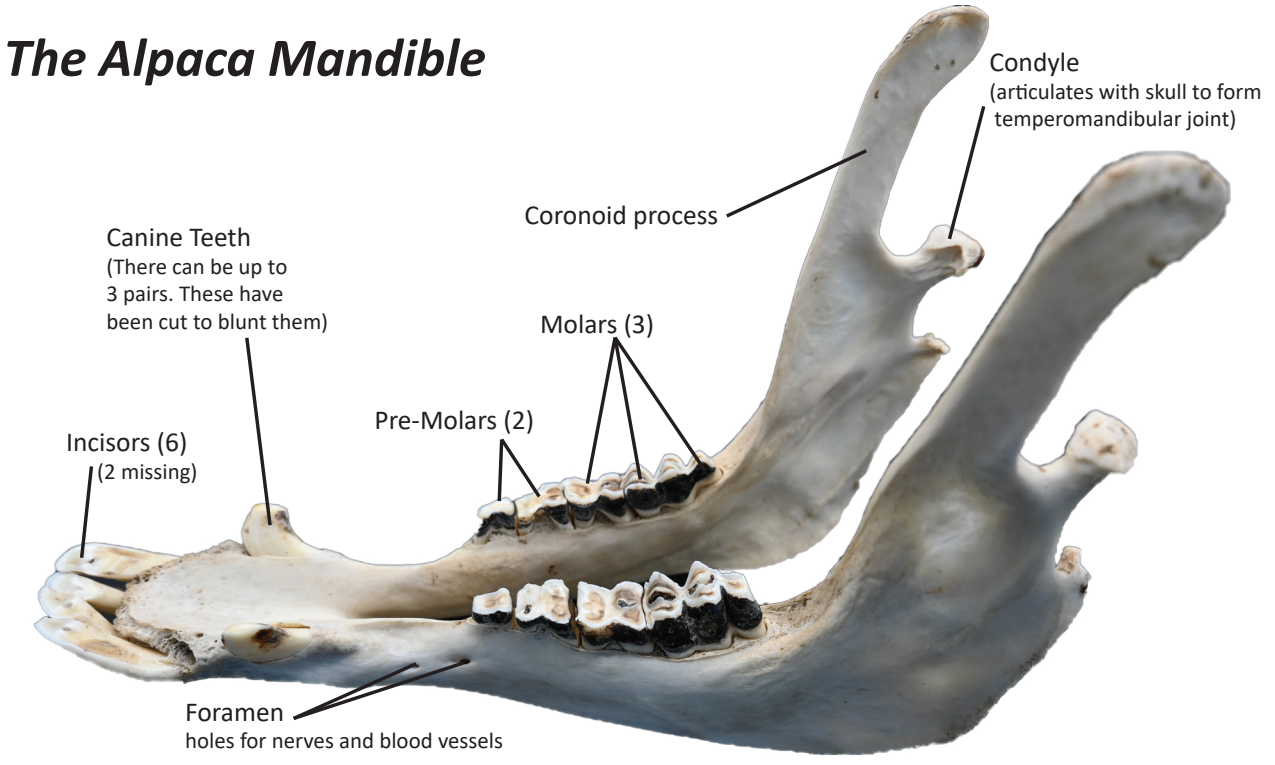
To trim incisors a special grinder called a "tooth-a-matic" can be used. A special cutting disc on a Dremel tool can also be used to cut the incisors. It may be necessary to trim the incisors each year to keep them at the proper length and best alignment with the upper gum.

To trim canine teeth, you can use a Dremel tool with a cutting blade or you can use OB wire. Each end of the OB wire is attached to a handle and the wire is looped around the canine tooth. A simple sawing motion with cut through the tooth cleanly, permanently dulling it so that it can do not harm.

Unless there is poor jaw alignment from side to side, alpacas do not need to have their molars ground or "floated." ***Never use clippers or nippers*** **to trim any teeth, for they can crack the tooth and cause tooth infections and jaw abscesses.**

Toenail Trimming

Alpacas have feet very different from other livestock and ruminants. Instead of having a hoof, they have two toes with nails that come



over the top and extend to the ground. These toenails grow at different rates depending on the alpaca. They may wear down because of rocky pastures or rough concrete barns, or they may grow to the point that they need to be trimmed as frequently as every month or two.

Toenails that are too long can cause the alpaca's toes to splay and force the alpaca to stand improperly because the toenails force the tip of the foot up and rock the alpaca back onto its pastern.

The easiest time to trim nails is on shearing day when the alpaca is restrained. Any other time, it will take two people to accomplish, one to hold the alpaca, and one to pick up the foot and trim.

Giving Medications

From time to time it might be necessary to give medication to an alpaca. It is best practice to do this under a Veterinarian's guidance, and if no Veterinarian is available, then an experienced alpaca owner. There are three ways to give medicine: topically, by mouth, and by injection.

Topical Medications

There are many medicines that can be administered topically.

- **Antibiotic Ointment:** Alpacas can get cuts and scrapes just like us. It is good to have an antibiotic ointment on hand to apply to any injuries such as a superficial cut or abrasion. A triple antibiotic ointment is what is most commonly used.
- **Antiseptic Sprays:** There are sprays and aerosols available that have antibiotic and antifungal capabilities. One of these is gentle iodine. This is routinely applied to a cria's umbilical cord immediately after birth to keep infection from passing through the cord and into the cria. Blue Lotion is another antiseptic spray that is commonly used for many different livestock species. It can also be used for alpacas to treat wounds and prevent infections. Both of these can be purchased at a livestock store.
- **Antiparasitic Topicals:** The skin of an alpaca is thicker than some livestock species, so absorption of antiparasitic topicals is not optimal. Most alpaca breeders do not use topical antiparasitic medicines. When the alpaca is in full fleece, it is difficult to be certain that the medicine is getting to the skin. Some alpacas have experienced burns using these, so even though they are convenient, check with your veterinarian before using.

photo courtesy of Cedar & Sage Alpacas

Oral Medications

You might be able to give a dog or cat a pill, but livestock are not given pills unless they have been dissolved in liquid. It is too difficult to get the pill to the back of the throat for them to swallow because they can't and won't open their mouths wide enough. Antibiotics and anti-parasite medicines can come in liquid form. The ingredients are mixed into a liquid and then given by drawing up the medicine into a syringe (without the needle) and squirting the medicine into the alpaca's mouth. There are two types of liquid medicines:

- **Suspensions:** A suspension is where the medicine is mixed in the liquid, but does not dissolve. You can't see through a solution when it is mixed. After some time, it will settle to the bottom of the container. It is extremely important to shake or stir a suspension well to be certain the medicine is distributed evenly throughout the liquid. This guarantees that your alpaca is getting the proper dose. If you have ever taken liquid antibiotics for an earache or bad cold, your parents gave you a suspension, they shook the bottle before giving it to you.
- **Solutions:** When the medicine is dissolved in a liquid it is a solution. Cough and cold syrups are examples of solutions. You can see through a solution. Some anti-parasite medicines are solutions.

Injectables

These medicines are what we call shots. Nobody likes to get a shot, but for some medicines it

is the only way to give an antibiotic, special vitamin, minerals, or antiparasitics. A very specific amount of medicine is drawn up into a syringe and injected into the alpaca. Everyone knows that the size of the needle determines how much a shot hurts initially. We would like to always uses tiny needles, but some medicines are thick like syrup or honey. When you are injecting a thicker liquid, you must use a bigger needle to allow you to push the liquid in as quickly as possible.

If giving shots makes you nervous, you can always grab an orange and a syringe with a needle and have some practice giving shots to the orange. Don't hesitate to ask your veterinarian or an experienced alpaca owner to show you how. You simply stick the needle in, pull back on the plunger to be certain you haven't entered a blood vessel, and then push the plunger!

There are three ways to inject medicine:

- **Subcutaneous:** With a subcutaneous injection the end of the needle is placed just under the skin into the fatty layer. Material injected this way is absorbed slowly and evenly. The wormer ivermectin is injected subcutaneously. Subcutaneous injections generally hurt less than injections given into the muscle. Because the needle is not going in very far, you can use a shorter needle. The abbreviation used for subcutaneous is SQ or SubQ.
- **Intramuscular:** This is an injection into a muscle. A longer needle is necessary to get the medicine deep enough into the muscle. Vitamins, minerals, and antibiotic shots are usually given into the muscle or intramuscular. The abbreviation for this is IM.
- **Intravenous:** It is very unusual for an alpaca owner to give shots this way for they are shots directly into an alpaca's vein. With fleece covering their skin, shaving the hair away may be necessary to give an intravenous injection in order to be able to find the vein. Obviously giving injections into a vein will get the medicine into the alpaca's system the fastest. Intravenous injections are abbreviated IV.

Alpacas have a unique sensitivity to steroids. They can cause a female to abort a developing cria. Even applying a cortisone cream to another alpaca in the pasture can cause an abortion in a pregnant female if she comes in contact with the medicine. Using steroids or cortisone type creams or ointments is strongly discouraged if the treated animal might even touch noses with a pregnant dam.

Calculating Medication Dosages

Alpacas come in many different sizes and just like you and your friends, they need different strengths of medicine depending on their size.

The easiest method is to ask your veterinarian how much medicine to give your alpaca, and you should never hesitate to do this. Sometimes alpacas require a different dosage than other livestock. The mathematics to calculate how much of a medication you give your alpacas is complex. While we describe how

Essentials Items To Have On Hand

Every alpaca caregiver should have a few essential items. If you plan to breed your alpaca, you'll need additional supplies, but we'll focus on the basics for now. Most of these items are available at local farm supply stores.

- You and your veterinarian's contact information should be clearly posted for easy viewing by you or a helper that discovers something is amiss.
- Hay and bedding with a dry place to store it.
- Water bucket or trough. If you live in an area where the temperatures go below freezing, you may want to invest in a trough that can hold a water heater. There are some troughs that have a drain hole where a heater can be inserted. Be certain the electrical cord is plugged into a GFI socket.
- Feed pan.
- Hay feeder.
- An alpaca and vermin proof storage container for any grain or supplements. A trash can with a tight lid will work.
- Pan for free choice minerals.
- Halter and lead for your alpaca (one per alpaca).
- Toe Nail Trimmers. Most use hoof trimmers that are used on goats and sheep.
- Flashlight or headlamp.
- A first aid kit that includes the same sort of things you would have for your family or pets. Triple antibiotic ointment, hydrogen peroxide, super glue (this was initially developed to fix deep cuts in humans and is an excellent way to close up a simple laceration on an alpaca), wound sprays such as gentle iodine or blue lotion spray, gauze squares, Vet Wrap (this is a disposable elastic type of bandage that comes in many different colors and are wonderful for wrapping a cut on a leg), bandage scissors, tape.
- Alcohol wipes to clean the tops of injectable solution bottles.
- Disposable syringes of different sizes (3 cc, 6 cc, 12 cc, and one or two 50 cc).
- Hypodermic needles for administering medications. One inch long and 18 gauge is a good general size.
- Thermometer to take an alpaca's temperature. The thermometer is placed in the rectum. Dedicate this to the barn as most of us do not want to use a thermometer that has been used rectally!
- Wheelbarrow to move manure.
- Fork to move manure and straw. A long handle will save your back.
- Leaf rake and shovel to help clean up alpaca beans. The shovel should be a "flat" shovel or "square" shovel, not round or pointed for digging. A longer handle will help save your back!
- If you live in a colder climate, you might want to have an alpaca coat or two, just in case an alpaca needs the added warmth.

to do this below, it is always best to have your veterinarian tell you how much to give. If you are unable to reach your veterinarian, you can ask an experienced alpaca owner to help you if they feel comfortable doing so. There are also several publications written by Veterinarians that will provide this information. Those are listed in our Resource Section. Veterinarian Dr. Pamela Walker has permitted us to include her document on medications in this handbook. It is **Chapter 17 The Camelid Medicine Chest by Pamela Walker, DVM**.

Step 1: Determine Your Alpaca's Weight

The first thing you must do is determine the weight of the alpaca. If you are treating a smaller cria, you can pick it up and step on your home scale, but if you are treating an adult, you won't be able to do that and you must estimate the weight. There are specially marked measuring tapes that you can purchase to estimate an alpacas weight, otherwise, unless you have a scale, you will have to make an educated guess. An adult alpaca weighs between 100 and 200 pounds. Males are larger than females and a female will weigh more when she is in the last months of pregnancy.

To complicate matters, some medications provide dosing information that refers to kilograms rather than pounds (lb). So you may have to convert your alpaca's weight from pounds to kilograms (kg).

1 pound = 0.454 kilogram

So if your alpaca weighs 125 pounds, you simply multiply that by .454 and you will have the alpaca's weight in kilograms.

125 lb. X .454 = 56.75 kg It is safe to round that up to 57 kg. So your 125 lb. alpaca weighs 57 kg.

Step 2: Determine the Medication Concentration

This information is included on the vial or bottle. The medication container will state that this product has a specific amount or concentration of medicine per milliliter (ml) or cubic centimeter (cc) of product. Cubic centimeter and milliliter are the exact same unit of measure. One cc of water is the exact same thing as one ml of water.

The medication concentration is usually referred to in this way:

mg/ml which means milligram per milliliter

mg/cc which means milligram per cubic centimeter

Step 3: Determine the Dosage Alpacas Are Supposed To Receive

Usually alpacas get the same dosage as goats, sheep, and cows, but not always. This dosage rate is also provided on the medication bottle, but alpacas won't be mentioned, just sheep, goats, and cattle. Hopefully your veterinarian will tell you what dosage to use. There are other sources that provide that information and a special chapter provided by Dr. Pamela Walker that provides the dosages for almost all of the medications used for alpacas is included with this manual. These are examples of how a dosage is written.

ml/kg which means milliliter per kilogram of alpaca weight

mg/kg which means milligram per kilogram of alpaca weight

mg/lb which means milligram per pound of alpaca weight

ml/lb which means milliliter per pound of alpaca weight

Step 4: Calculate How Much to Give Your Alpaca

Let's use SafeGuard Liquid Suspension as an example. The medicine is not dissolved, but is floating in the liquid, so you must be sure to shake it very well. The recommended dosage is 10 mg per pound of alpaca.

1. Our 125 pound alpaca then needs 125 lb X 10 mg = 1250 mg of SafeGuard (fenbendazole)
2. The concentration of SafeGuard Liquid Suspension is 100 mg/ml
3. If there are 100 mg of fenbendazole in each ml (100mg/ml) of SafeGuard then 1250 mg ÷ 100mg/ml = 12.5 ml

So you need to give your alpaca 12.5 ml. That may sound like a lot, but one teaspoon is 5 ml, so that really isn't very much at all!

Basically, determining how much medicine to give is an algebraic equation. Ultimately the goal is to determine how many milliliters of medicine we should give. Therefore we want to have ml on top of the equation when we are done. To accomplish this, the concentration of mg per milliliter is flipped from 100mg/ml to 1ml/100mg. The formula for calculating dosages looks like this:

Alpaca Weight X Alpaca Dosage X Medicine Concentration

Using the same example:
125 pounds X 10 mg X 1 ml = 12.5 ml of SafeGuard 100mg/ml suspension

Caution

It is important to note that some medications come in different concentrations. Vitamin D is an example of this. People have harmed their animals by giving too much vitamin D, mistakenly assuming it was a lower concentration.

What You Should Know

- You need to know when to call the veterinarian.
- Alpacas require adequate shelter placed to protect them from the weather.
- The shelter needs to provide approximately 18 square feet per alpaca (3' X 6').
- As prey animals, alpacas prefer to be able to see around them and will sit under the eaves or at the opening of the barn instead of inside.
- Fencing needs to be at least five feet high and have spacing small enough to keep an alpaca from being able to stick its head through.
- Gates need to be predator proof and prevent alpacas from sticking their heads through.
- A catch pen makes training and husbandry much easier.
- Know how to body score an alpaca.
- Schedule annual shearing with an experienced alpaca shearer each spring.
- Familiarize yourself with what is necessary for shearing day.
- Know and be able to identify the four different types of alpaca teeth: incisors, canine, premolars, and molars.
- Toenails need to be trimmed regularly.
- Know the three different types of medications: topical, oral, and injectable.
- Familiarize yourself with the list of items that are essential for alpaca care.

CHAPTER 7

Alpaca Nutrition & Feeding

Alpaca Nutrition

The health of alpacas is greatly dependent on their nutrition. An appropriate diet and clean water are key to giving alpacas the ability to fight off infections, parasites, and to be able to produce a beautiful fleece and healthy crias. Good body condition allows an alpaca to freely move around its environment to graze.

In their native western South America, alpacas' nutrition is provided by grazing over large areas. The climate in South America allows them to graze all through the year. Here in North America there are few places that allow grazing the entire year, so alpaca owners must provide additional forage and feed. This chapter covers two types of feed: forage and man-made supplements.

Several years ago, Dr. Nancy A. Irlbeck wrote an excellent article titled *Basics Of Alpaca Nutrition*. It might be too technical for many of us, but still includes excellent material for anyone keeping alpacas. She describes alpaca nutrition as a puzzle with many pieces. The pieces to put that puzzle together will vary with each animal, each farm, the hay or pasture that is available, the environment, supplements that are available, and finally the finances of those keeping the alpacas.

It is also essential that alpaca caregivers become familiar with their alpacas. Learning to body score an animal (Chapter 6) to assess its weight is important. Watching how an alpaca moves about the pasture and how it interacts with the other alpacas can give you clues about how it is feeling. Changes in behavior can be the first sign that an alpaca is unwell.

photo courtesy of Island Alpaca Co of Martha's Vineyard

All animals (including humans) need six elements in their diet to survive: water, carbohydrates, fat, protein, vitamins, and minerals. In South America, alpacas get all these nutrients from grazing. Here in North America alpaca owners often provide more sources of food to their alpacas than just grazing.

Water

While it is not a food and provides no calories or energy, water is still an essential nutrient. Alpacas might be able to survive for several days without food, but they cannot survive without water. The alpaca owner must be certain to always have fresh, clean water available to their animals.

Demands for water increase in hot weather, when a female is providing milk to a cria (baby alpaca), and in the winter months when alpacas are eating dry hay.

If hoses are used to fill buckets and troughs, owners should drain them between each use to help prevent bacteria from building up in the hose. Likewise, buckets and troughs should be cleaned regularly. Heated buckets and troughs are available to keep water from freezing in the winter, but they require electricity. If these are being used, it is important to guard you and the alpacas from electrocution by keeping extension cords out of water, strung in a manner that will prevent anyone from getting tangled, and being certain that the extension cord is rated for outdoor use and is safe for the wattage necessary to run the heating elements in the buckets or troughs. It is also important to be certain that the buckets are never empty, for the elements may burn out, or melt the bucket, and even start a fire.

Carbohydrates

Most of us eat plenty of carbohydrates because bread, potatoes, candy, cake, juice, and soft drinks are all very high in carbohydrates. More simple carbohydrates such as starches like bread and potatoes, and sugary things like candy, are easy to digest and excellent sources of quick energy. Plants such as grass, broccoli, carrots, celery, spinach, and alfalfa are primarily made up of material called cellulose and are known as complex carbohydrates. Cellulose is much more difficult to break down into usable energy, but as we talked about in an earlier chapter, the alpaca's digestive system is uniquely designed to do just that.

Fats

Fats are things like oil and butter. Since alpacas mostly eat plants and never eat greasy French fries or hamburgers, they do not get much fat from what they eat. Alpaca crias who are growing, need the extra energy fat provides, and they get the necessary fat from the milk their mother gives them.

But alpacas can and do get fat when they eat too much because fat can be built from carbohydrates. A small amount of fat in our body is not bad because it is a great way to store energy for those times when there may not be enough food. During those times, the alpaca's system can break down that stored fat back into carbohydrates to provide energy.

The alpaca diet is very low in fat content, so if an alpaca is fat, it is because they have been fed

too may carbohydrates and the extra energy was made into fat for storage.

Proteins

Protein is found in things like beans, nuts, meat, milk, and eggs. Protein is extremely important for all animals because it is what the body uses to build things like muscles, skin, and fleece. Only crias get a diet high in protein when they are nursing from their mom. Since adult alpacas do not eat meat and are never given cheese, eggs, or nuts, they must get their proteins from what is in their pasture, hay bin or feed bowl. But plants don't have much protein so where do alpacas get the protein they need? The wonderful design of the alpaca digestive system allows them to get their protein requirements from the organisms in their stomach that help them break down their food (see the section on the alpaca stomach earlier in this chapter).

photo courtesy of Palloy Alpaca LLC

Vitamins and Minerals

Vitamins and minerals are important tiny nutrients that all animals and plants need to live. Fortunately, plants are high in vitamins and minerals and alpacas can get most of what they need from what they eat. There are a few vitamins and minerals that alpaca owners want to be extra sure to provide. We do this by providing what are called supplements.

Feeding Alpacas

Forage: Pasture and Hay

To forage means to search for food. Grazing and browsing are words that refer to foraging for food such as grasses and taller plants, bushes, and trees. In their native environment, alpacas must acquire all their food from grazing and browsing over open land where the soil is dry and the vegetation is sparse. Here in North America alpacas usually don't face such challenges. Here alpacas live in pastures with grass to graze or in lots where hay is provided. Grazing in pastures is the simplest and most natural way to feed alpacas. It is less expensive and easy for the alpaca owner too.

Pastures

Pastures and hay are primarily made up of two different types of plants — grasses and legumes. Grasses vary in quality and certain types are better suited to certain areas of the country. Some types of grasses found in pastures and hay across North America are:

- Orchard grass
- Fescue
- Rye
- Timothy
- Brome

- Switchgrass
- Bluestem
- Bermuda

Legumes are also found in pastures and hay. These plants have the special ability to take nitrogen out of the air and soil and convert it to protein. This makes them higher in protein content than grasses and easier for animals to digest when compared to grasses. This quality can make them a valuable addition to the alpaca diet, especially if the alpaca is pregnant, underweight, getting over an illness, or nursing a cria. Some types of legumes are:

- Alfalfa
- Clover
- Birds Foot Trefoil

As you can see, there are many different grasses and legumes that can be grown in pastures. Different grasses and legumes are suited to different types of soil and climates. Your county's Extension Office is your best resource for finding the varieties of forage that will do well in your area. Some varieties grow well in cooler weather and some can better tolerate hot and dry weather. For this reason, it is best to use a mix of several different types of grasses in your pastures to have something growing well for as long as possible.

There are several plants that are poisonous to livestock. Some of these are plants that are grown to decorate the landscape around a home or yard. Be sure that your neighbors do not feed alpacas lawn trimmings or branches that have been trimmed from their yards as it might cause accidental poisoning. Alpacas usually avoid harmful plants unless the pasture has been grazed to the point where there is little left to eat.

There are also some forages to avoid planting:

- Rye grass is known to cause a disorder called rye grass staggers, so it should not be planted in alpaca pastures. A fungus called an endophyte that produces toxins grows on both perennial rye and to a lesser extent on annual rye grass. The fungus toxin is ingested by the alpaca and causes the alpaca to stumble and shake.
- Kentucky 31 Tall Fescue is a variety of grass that is very popular for livestock pastures because it tolerates poor soil, is tough when walked on, and is drought resistant. Unfortunately, it harbors a fungus called an endophyte that has toxins which can cause poor weight gain, reproductive issues, and circulation issues. There are endophyte free varieties of tall fescue, but they can become contaminated with endophytes over time. Again, your extension agent will be very helpful to direct you to resources to avoid issues.
- Ladino clover is a legume that is often included in pasture seed mixes. Unfortunately, it can cause stomach upsets in alpacas (and other livestock), usually when it is blooming in the summer time. It tolerates overgrazing better than grasses, and over a few years can slowly take over a pasture.

Hay

Hay is another type of forage, and, after pasture, it is the next most frequently used food for alpacas. Most alpaca breeders will have to provide hay for at least part of the year, and some provide hay all year long.

Hay comes in various forms, including the traditional "square" bale, which is a rectangular block approximately 16 inches by two feet by three feet. It can come in much larger bales,

or in very compact, but dense smaller bales. Feeding round or large square bales requires large equipment to move them, as these bales can weigh a ton or more.

Hay can vary in content from total grass hay to a 100 percent alfalfa hay, or a mix of the two. Most alpaca breeders prefer hay that is primarily orchard grass.

Hay is also designated by cuttings. First cutting is the first hay of the season and usually includes more stemmy material because of the seed stalks sent up by the grass in springtime. First cutting hay is less desirable because it is less palatable, less nutritious, and often has seed heads which can get stuck in the alpacas' fleeces and are difficult to remove prior to processing.

Second cutting hay is less stemmy, more nutritious, and the grass is softer and more palatable. Second cutting hay also has fewer

seed heads. Usually, third and fourth cutting hay are softer still, and even more palatable.

The nutritional content of the hay can vary depending on the cutting and the type of plants the hay was cut from. Fertilization and weather can also affect the hay nutrients. Grass hay will be lower in protein than a hay that has a lot of alfalfa in it. First cutting hay usually is lower in nutritional value than bales from the same field cut the second time in a season.

Hay should always smell fresh and clean. Mold can be a problem if hay gets wet or is harvested before it is dry enough to be baled. If the hay smells musty, or if mold is visible it should not be fed to any livestock.

It is very important to store hay properly and to be certain it is adequately dry before bringing it to the barn. Hay that is harvested with too much moisture, or hay that gets wet can spontaneously catch fire. It is important to contact a hay supplier in the summer to be certain you will have enough to feed your alpacas during those times when pastures are not growing.

Hay Versus Straw

There are two products that are baled on a farm. Hay is the grass and/or legumes such as alfalfa that will be stored and fed to livestock. Hay bales are green. Straw is a byproduct of harvesting grain. It is the stem of the grain plant left after the seed head has been cut off. Wheat, rye and oat are the most common types of straw. Straw is used mostly for bedding livestock and is not nourishing enough for food. A straw bale is gold colored.

There are three broad categories of supplements to include in alpaca diets. Alpacas have been in North America as livestock for only 40 years. Alpaca nutrition continues to be studied and researched so that alpaca feed is modified

> Before feeding any supplement to alpacas, you need to be certain it does not contain any medication in the mixture. Certain medications included in other livestock feeds can be fatal to alpacas.

every few years. Some supplements are given to alpacas based only on the success that they have provided with other livestock species.

Mineral Supplements

This is the first group we will discuss. These are essential to keep your alpaca healthy. There are some minerals that alpacas cannot acquire naturally here in North America. Owners should consider the mineral needs of their alpacas and find a source to provide what is missing. These may come in a bag as a powder and are placed in a bowl or small trough out of the weather for the alpacas to nibble on as they need to. Salt blocks are not as effective as powders for alpacas. There are special mineral mixes that can be purchased for alpacas and llamas, or some owners buy minerals for sheep and use those instead, although they are not as optimal.

Salt is a major ingredient in mineral supplements, but many other essential nutrients are added such as B vitamins, Vitamins A, D, and E, calcium, zinc, selenium, copper, potassium, phosphorus, etc. It is best to provide minerals made especially for alpacas and llamas because

they have some special mineral requirements that other livestock minerals do not provide.

Livestock Feed Supplements

These are the second category of supplements. Livestock feeds are made from many different ingredients such as distillers grains by-products, wheat middlings, soybean meal, etc. Those specifically developed for alpacas and llamas are the best choice, however they often are more expensive than other livestock feeds.

There are several companies that make supplemental feeds specifically developed for alpacas and llamas. They are not to be used as the only source of nutrition, but they help ensure that alpacas receive a complete diet including important vitamins and minerals. These supplements are purchased at a store that sells livestock feed and usually come in 40 or 50 pound bags. Usually no more than two pounds are fed per day. Alpaca feeds have been developed from research that has shown the best balance of nutrients for alpacas and their fiber. This makes them the best choice for supplementing. Many owners choose not to feed supplements, especially if they are not involved in breeding alpacas.

Again, it is important to be able to assess your alpacas to determine if they are overweight, underweight, or "just right." As alpacas age they may have more trouble keeping weight on, and females that are pregnant or nursing may require additional supplements.

Not all feeds are made the same. They vary in nutritional content as well as texture. Some are pellets, some are crushed pellets, and some are a mix of pellets with grain and additives. It is best to discuss the use of supplements with your veterinarian and experienced alpaca owners. The supplement feed bags always have tags that provide the nutritional information and feeding directions. Look at those to be certain you know what you are buying and how much to give your alpacas.

If the alpaca caregiver is going to feed supplements to their alpacas it is best to introduce them slowly. Providing high amounts of carbohydrates to an animal can cause an overgrowth of the microorganisms in the alpaca's stomach and make them sick.

Supplements should always be stored safely away from the alpacas, in secure containers or spaces, and out of reach of any vermin that can contaminate the food. If alpacas do get into the supplements and eat a large quantity, immediately call your veterinarian for this can potentially kill the alpaca with a condition called bloat.

Feeding instructions will also vary between products, so read labels carefully and note that alpacas have different feed requirements if they are growing, older, pregnant or lactating (nursing a baby). The supplement feed bags always have tags that provide the nutritional information and feeding directions. Look at those to be certain you know what you are buying and how much to give your alpacas.

Although not optimal, sheep feed can be a good compromise if alpaca feed is too expensive for

your budget. Goat or cattle feed is not because it may have copper levels that are too high for alpacas. Sheep are sensitive to copper and their feed has smaller quantities that make it safe for alpacas.

Sometimes an alpaca may get too thin. In this case it may be helpful to add other supplements to increase the calories the alpaca eats and help it gain weight. It is best to speak with your veterinarian about additional supplements before starting to use them.

Usually no more than two pounds are fed per day. Feeds specifically for alpacas have been developed from research that has shown the best balance of nutrients for alpacas and their fiber. This makes them the best choice for supplementing. Many owners choose not to feed supplements, especially if they are not involved in breeding alpacas.

photo courtesy of Slade Acres

Before feeding any supplement to alpacas, ***you need to be certain they do not contain any medication in the mixture***. Certain medications included in other livestock feed can be fatal to alpacas. Never give an alpaca medicated feed without talking to your veterinarian.

Special Supplements

This is a broad category that includes many different things. Most of these are extra sources of nutrition to take care of special circumstances. Often, they are given to alpacas that are underweight, or perhaps an owner knows that the hay they have purchased is of lesser quality and they want to be certain their animals have adequate nutrition. The list below is far from complete, but it gives you an idea of what is available.

- **Grains:** It is possible to go to the feed store and buy a bag of corn or a bag of oats. Some alpaca owners will do this to add some simple carbohydrates to their animal's diet. This should be done carefully and gradually. If straight grain is added, it is best to use cracked corn or rolled oats as these will be easier to digest. Whole, intact grain is not part of an alpaca's natural diet in South America.
- **Alfalfa Pellets:** Some livestock feeds come with alfalfa pellets already included, but it is also possible to purchase a bag of alfalfa pellets separately. This is a way of adding calories and protein to the diet. It is safer way to add calories and protein to the diet than straight grain because the simple carbohydrate content is not as high, making it less likely to cause stomach issues.
- **Beet Pulp:** This can come in either shredded form or as a pellet. In either form it must be soaked before giving

Features and Benefits

- **Specially formulated to meet the nutritional needs of alpacas.**
- **Feeding rates may provide added energy** - For optimal growth, gestation and lactation.
- **Coarse mixture of grains and pellets** - More suitable for crias to creep feed.
- **Contains shredded beet pulp** - An excellent source of insoluble fiber.
- **No distillers dried grains and solubles -** Aids in reducing the risk of mycotoxin contamination.
- **Added vitamin E and selenium** - Essentially eliminates need to supplement.
- **Fortified with vitamins and organic minerals** - Enhances bioavailability.
- **Contains yeast cultures** - Promotes feed digestibility and added palatability.

Product Form

Course feed: 5/32" diameter x ½" length pellets with grains. **Catalog #**

- 40 lb. net weight paper sack 0061324

Guaranteed Analysis

Crude protein not less than	12.0%	Phosphorus not less than	1.60%
Crude fat not less than	2.0%	Salt not less than	0.45%
Crude fiber not more than	14.0%	Salt not more than	0.95%
Ash not more than	12.0%	Sodium not more than	0.65%
Calcium not less than	1.65%	Selenium not less than	1.0 ppm
Calcium not more than	2.15%	Selenium not more than	1.2 ppm

Ingredients

Wheat middlings, ground soybean hulls, dried beet pulp, cane molasses, sun cured alfalfa, monocalcium phosphate, dicalcium phosphate, cracked corn, dehulled soybean meal, wheat flour, soybean oil, calcium carbonate, yeast cultures, salt, zinc proteinate, thiamin mononitrate, phosphoric acid, dl-alpha tocopheryl acetate (form of vitamin E), propionic acid (preservative), manganese proteinate, apple flavor, niacin, choline chloride, sodium selenite, calcium sulfate, manganese sulfate, vitamin A acetate, copper chloride, calcium pantothenate, biotin, cobalt proteinate, cholecalciferol (vitamin D_3), riboflavin, vitamin B_{12} supplement, calcium iodate, iron proteinate, pyridoxine hydrochloride, menadione sodium bisulfite complex (source of vitamin K), folic acid.

Feeding Directions

- To be fed with free-choice hay or pasture. In order to meet NRC recommendations for new world camelids, animals being fed hay should consume this product at a rate of at least 0.5% of body weight (BW). Animals on fresh pasture should consume this product at a rate of at least 0.25-0.33% of BW.
- Daily supplement amounts shown below should be divided between two feedings:
    - Pregnant females in good condition, 0.75 to 1.0 lb. feed per dam per day for last 4 weeks of gestation
    - Lactating females, 0.75-1.0 lb. per dam per day through 3 to 4 months of lactation
    - Crias 8 weeks of age to weaning, 0.25-0.34 lb. per 50 lbs. of animal BW
    - Active or growing animals, 0.33-0.50 lb. per 50 lbs. of animal BW
- Always provide animal with plenty of fresh, clean water.

Caution - Follow label directions: Feeding added selenium at levels in excess of 0.3ppm in the total diet is prohibited

DO NOT FEED TO SHEEP DUE TO HIGH LEVELS OF SUPPLEMENTAL COPPER.

it to your alpacas or they might choke (esophagus blocked). Beet pulp is an excellent high fiber way to add calories. It comes from sugar production. Sugar beets have their sugary juice extracted leaving the shredded, dry beet pulp behind. They are not sweet, but livestock seem to enjoy them. As with any supplement introduce them slowly to the alpacas to avoid stomach upset.

- **Calf Manna:** This product comes in pellet form and can be added to other feeds to increase calories. It is higher in protein (25 percent when alpaca feed normally has between 12 – 16 percent protein). It is used by many different livestock producers from cattle and horses to rabbits and chickens.
- **Chaffehaye:** Is a fermented alfalfa product where the alfalfa is harvested, chopped, and then put in an airtight bag. The alfalfa ferments and the added micro organisms make it an excellent source of both protein and vitamins. This product is usually "top-dressed" onto other alpaca feed.

Supplement Tags

Each livestock feed has its own recipe and unique nutritional values, listed on the feed tag or printed on the bag. The feed tag also provides instructions on how much to feed based on the animal's condition (growing, older, lactating) and their weight. Just as we compare food labels at the grocery store, it's wise to compare supplement labels. Remember, if junk food isn't good for us, it isn't good for your alpacas either.

On these tags, you might see terms like Distiller's Grain Products, Processed Grain Products, Plant Protein Products, and Roughage Products. While these names may sound off-putting, these ingredients are actually ideal for alpacas. So don't worry — you're not giving your alpaca substandard supplements when you see these listed.

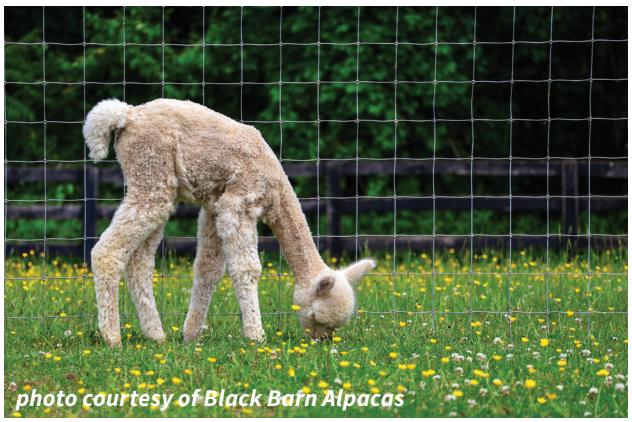


photo courtesy of Black Barn Alpacas

What You Should Know

- Alpacas have the same requirements as other grazing mammals: fresh water, pasture or hay, minerals, and vitamins.
- Alpacas need a diet with 12 to 14 percent crude protein.
- By far, the largest part of an alpaca's diet should be hay or pasture (or both).
- Hay and pasture consist mostly of two types of plants: grasses and legumes.
- Familiarize yourself with the dierent kinds of supplements that are made available to alpacas.
- Be able to name at least three different types of pasture plants.
- Female alpacas that are pregnant or nursing require more food.
- An alpaca recuperating from an illness or injury requires more food.
- Body scoring or weighing your alpaca is a good way to know how well it is eating.
- Alpacas need more food in cold weather than in warm.

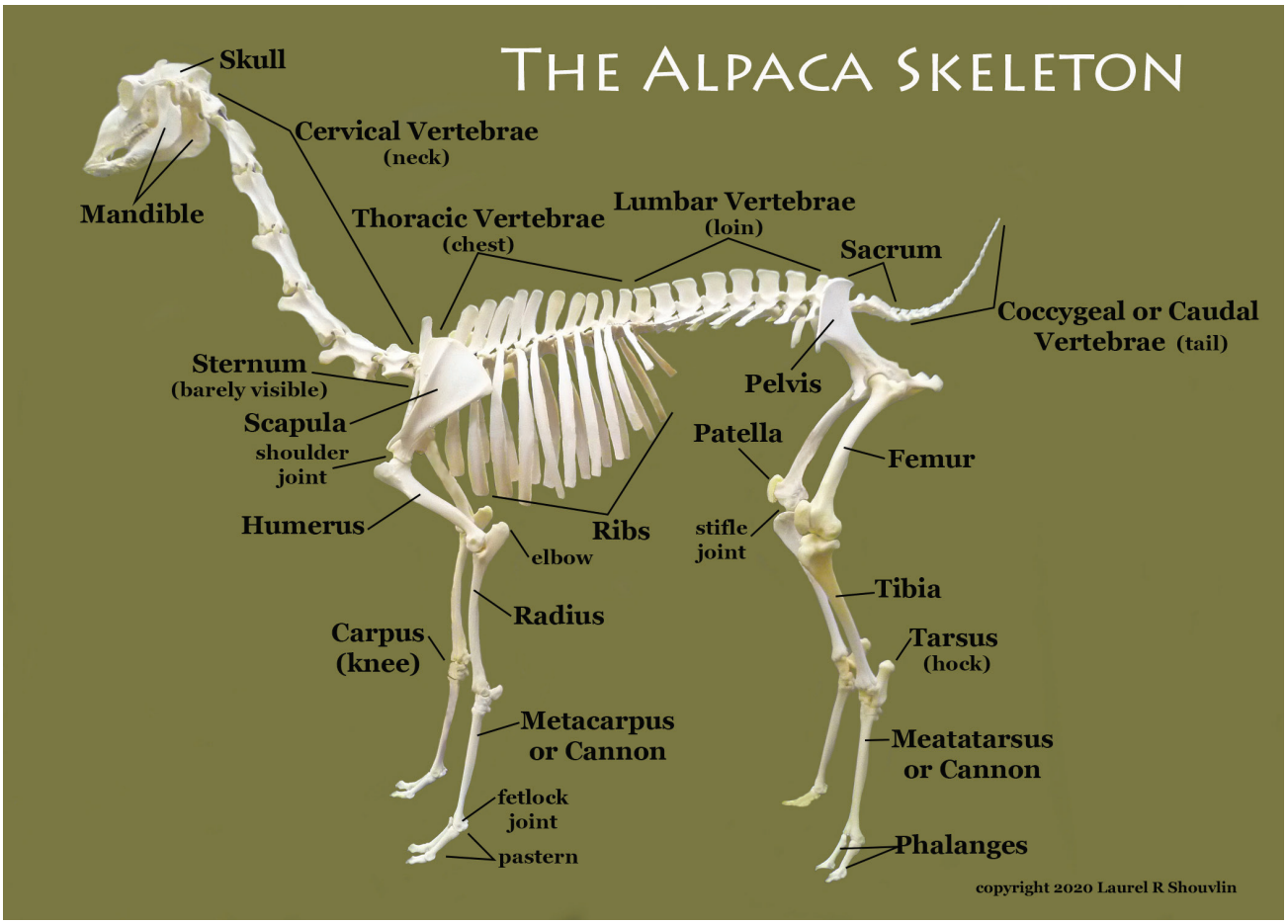
CHAPTER 8

Alpaca Anatomy

Introduction

You and your alpaca are very complex organisms. You both have many different parts and systems that must work together to allow you to exist. What we will provide here is a brief overview of the anatomy of an alpaca so that you will have a basic understanding of how your alpaca is able to do what it does- move, breathe, eat, reproduce, and grow fleece. This will help you to understand some of the reasoning for what we do to take care of alpacas and what we do to try and help them when they are sick or injured. This will help you explain what you think is wrong when you speak with your veterinarian.

When we talk about anatomy we organize the body into systems. These systems are then divided into organs, organs into tissues, and tissues into cells. For instance, the circulatory system has many parts including the heart. The heart has several types of tissue such as muscle tissue that contracts to pump the blood. The muscle tissue is made up of individual cells. It is not necessary for us to talk very much about cells and tissues here, but we will discuss the



different systems and some of the organs.

The Reproductive and the Digestive system both have their own chapters in this handbook.

Skeletal System

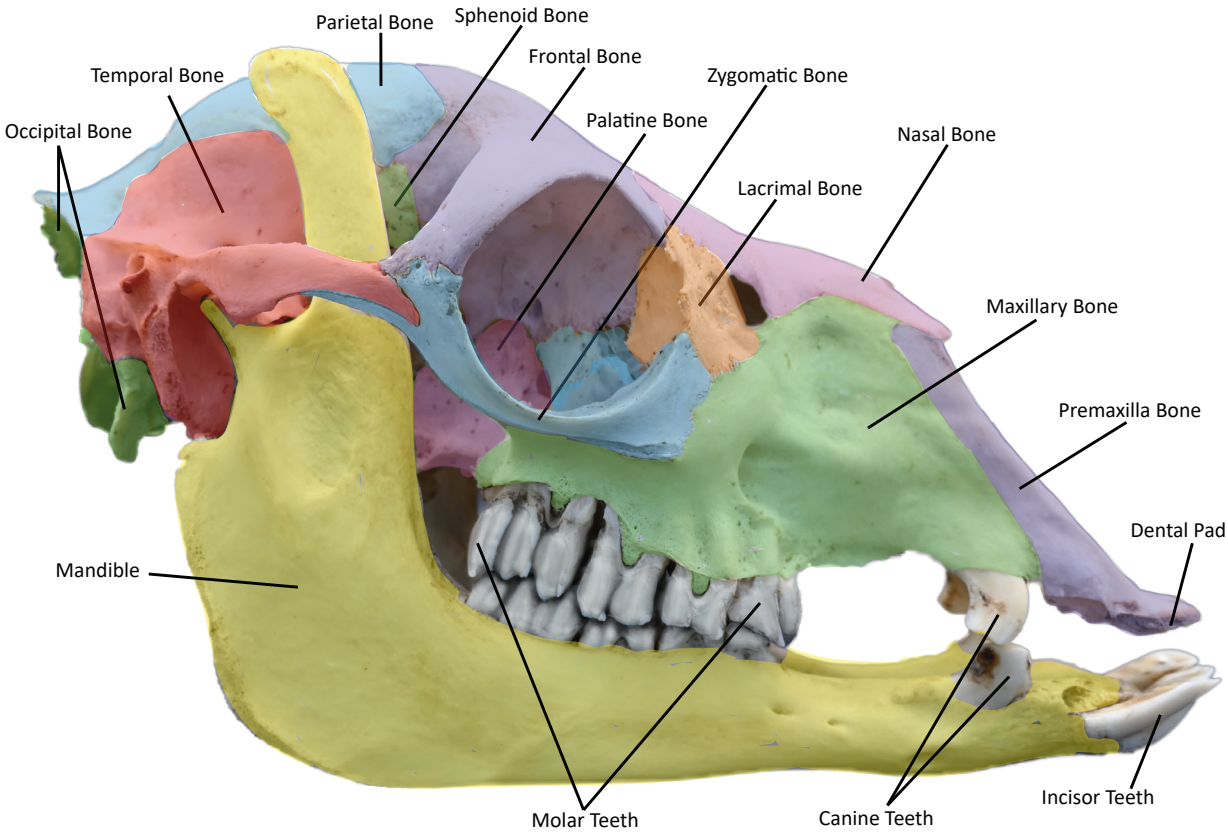
Alpacas can stand and move because they have bones—what is called the skeletal system. Most of their bones are given the same name as the bones we have, but theirs may be longer or shorter, or shaped a little differently. There are also a few bones that are completely different from ours.

The skeleton or skeletal system has three jobs.

1. It provides the structure to which muscles attach. The muscles and bones are what allow alpacas to move and to be more than a blob of skin and organs on the barn floor.
2. The bones also help protect the organs of other systems. For instance, the skull protects the brain and the ribs protect the lungs and heart and some of the digestive system.
3. The marrow in the middle of some bones is responsible for making blood cells.

The Bones of the Skeletal System

- **Skull:** The skull is made of several bones that mesh together at joints called fissures. It is not necessary to know all of the names of the bones that fit together but it is interesting to note that an alpaca skull has the very same bones that our skulls do. They are just differently shaped and sized. The skull holds and protects the brain, holds our top set of teeth, connects to our backbone, and serves as the entrance for our digestive and respiratory systems. It also is where four out of our five senses are located: sight, smell, hearing, and taste.
- **Mandible:** The mandible is the scientific word for the jaw. The mandible holds the bottom set of teeth and is the part that moves as the alpaca chews.
- **The Spinal Column:** The spinal column is the scientific word for the backbone and it includes the entire back from the top of the neck to the tip of the tail. There are several sections of the spinal column and the individual bones are called vertebrae. Tucked inside the spinal column is the spinal cord which is a long tube of nerves that carry signals from the brain to the limbs, chest, and belly and back to the brain.
- **Cervical Vertebrae:** Cervical vertebrae in alpacas, just as in humans, consist of seven bones that form the neck. The first two cervical vertebrae are the atlas and the axis. They allow the head to turn from side to side and to bring the mouth toward the chest. Alpaca cervical vertebrae are much bigger and longer that ours which makes the alpaca neck much longer.
- **Thoracic Vertebrae:** Thoracic vertebrae in alpacas, just like in humans, consist of 12 bones. These are the bones that the ribs attach to on our backs and alpaca backs too.
- **Lumbar Vertebrae:** The lumbar vertebrae is the part of the back just before our rear end. We call this the lumbar region in humans. In alpacas, it's referred to as the loin. Humans have five lumbar vertebrae, but alpacas have seven. That is one reason why their back is longer than ours. The lumbar vertebrae help support the belly.
- **Sacrum:** The sacrum is a single bone made from fusing five bones together. The sacrum connects the lumbar spine to the pelvis.



- **Coccygeal Vertebrae:** Coccygeal vertebrae are the bones that make the tail. Sometimes they are referred to as caudal vertebrae. Humans do not have a tail, but we do have coccygeal vertebrae. You may have heard of someone breaking their tailbone by falling on their backside. Another way to say that is they broke their coccyx or coccygeal vertebrae. The number of coccygeal vertebrae in an alpaca varies between 10 and 15.
- **Pelvis:** The pelvis, like the skull, consists of several bones fused together. The pelvis helps to protect and support the organs found in the abdomen such as the intestines, the reproductive organs, and the bladder. The female pelvis is shaped differently from the male to allow the passage of a cria at birth. The pelvis serves to connect the spine to the back legs. The sacrum forms this connection. The joint between the sacrum and the pelvis is the sacroiliac joint.
- **Sternum:** The Sternum connects the ribs on the left side of the chest to the ribs on the right side. We often refer to the sternum as the breast bone. It starts at the top of the chest and runs down to the indentation where the ribs meet in the middle by your abdomen or belly.
- **Ribs:** Ribs, along with the sternum and thoracic vertebrae, form a bony cage surrounding the chest cavity. They are very important because the protect and support the lungs and heart. They also provide some protection for some organs

that are in the abdomen, but tucked up toward the chest. The liver, stomach, kidneys, intestines, and spleen are all partially protected by the ribs. The ribs connect to the thoracic vertebrae in the back, and the sternum in the front.

- **Scapula:** Scapula is also known as the shoulder blade. It is somewhat triangular shaped and serves as the connecting bone between the back and the front leg. The joint between the scapula and the humerus is the shoulder joint.
- **Front Legs:** Front legs have some bones that share the same names as those in the back legs. But there are some different bones too. We will discuss front legs and hind legs separately to make things crystal clear.

  Humerus: This is the first bone of the front leg. It articulates or attaches to the scapula at the top and the radius at the bottom. Just as with humans, the joint between the humerus and the radius is called the elbow.

  Radius: This is the next bone in the front leg. It connects with the humerus at the top creating the elbow joint, and extends down to meet the carpus. This joint is called the knee. Humans have two bones side by side in their forearm. The radius is on the thumb side and the ulna is on the little finger side. In alpacas the radius and ulna have grown together to form one bone.

  Carpus: There is a collection of smaller bones called carpal bones that compose the knee area. In humans our carpal bones form our wrist and the first part of our hand. These carpal bones serve as the connection between the radius and the next longer bone called the metacarpus.

  Metacarpus or Cannon: This is the long bone between the knee and the foot. This is referred to as the forelimb. Humans have five metacarpals that form the palm of our hand, but alpacas have only one and it forms the lower leg. The joint formed between the metacarpus and the first phalange is called the fetlock joint.

  Phalanges: In humans the phalanges are the bones that make our fingers, but in alpacas the phalanges are combined differently to form the foot. The first phalange meets the metacarpus and the joint it forms is called the fetlock. The area formed by the first phalange as it moves from the fetlock joint to the remaining foot is called the pastern. The remaining phalanges form the foot and toes. Alpacas have two toes that many people think are odd looking. The toenail rests on top of the toe. Most livestock have hooves that extend front and back and down to the ground.
- **Hind Legs:** Hind legs are attached to the body by way of the pelvis, which is then attached to the spine.

  Femur: This long bone extends from a socket in the pelvis down to meet the tibia. While we call the joint between the femur and tibia a knee, in alpacas and other livestock, this joint is called the stifle. This bone extends forward toward the front leg.

  Patella: At the front of your knee, you have a small bone called the patella or knee cap. Alpacas have one in the same place. It is the largest of several sesamoid bones found in different places in the skeleton. Sesamoid bones provide added leverage for ligaments and muscles to improve their effectiveness.

photo courtesy of Legendary Alpacas of Texas

Tarsus: There are several small bones between the femur and the next long bone, the tibia. The tarsal bones are similar to the carpal bones in the front leg, and as a group are called the tarsus. Humans have tarsal bones which form our ankle and the first part of our foot.

Tibia: The tibia is the next long bone of the hind leg. It extends backward as it moves down to meet the next long bone.

Metatarsus or Cannon: You can see that the cannon bone in the front leg, the metacarpus, shares a similar spelling to the cannon bone in the hind leg. That's because they are very similar in structure, placement, and function. The joint between the metatarsus and the tibia is called the hock.

Phalanges: Identical to the forelimb, the metatarsus meets the first phalange which make the last part of the hind limb and the first part of the alpaca foot. Once again, the joint between the metatarsus and the first phalange is called the fetlock, and the area of the limb created by this first phalange is the pastern. The remainder of the foot and toes is formed from several phalanges.

photo courtesy of Red Granite Ranch, Ltd.

Muscular System

As alpaca caregivers, we do not need to know much more about the muscular system beyond that it exists. Each muscle has a specific name and is responsible for a specific movement. Two of the most important muscles in the body are the heart and the diaphragm. The heart is the muscle responsible for pumping blood and the diaphragm is responsible for breathing. The diaphragm also separates the chest cavity where the lungs and heart are, from the abdominal cavity where the stomach, intestines, kidneys, and reproductive organs are. Muscles in the wall of the digestive tract are responsible for moving food from the mouth to the anus.

Muscles attach to bones using special tissue called tendons. Sometimes a tendon can get injured or torn which will interfere with an alpaca's ability to move. When a person sprains their ankle, they have injured their tendons and muscles. Ligaments connect bone to bone. Ligaments can be torn or injured also, causing problems with moving about the pasture. Cartilage is a special type of tissue that is rubbery. It is found between bones and acts as a cushion and a smooth surface so bones don't rub against each other and wear each other down. Cartilage is the material that makes ears stand up and the nostrils to stay open. It is flexible but somewhat stiff. Your nose and an alpaca's are made partly of cartilage and bone.

Alpaca Conformation

Conformation refers to how the skeletal and muscular systems have been put together. Is its back or topline straight, humped, or does it sag in the middle? Are the legs straight in front or do they come in at the knees? Do its lower incisor teeth align properly with the gum above? Are its ears spear shaped or are they shaped like the llama's banana ears?

Conformational faults can lead to problems. A narrow pelvis can cause difficulty when giving birth. Dropped pasterns can be painful and cause an alpaca to avoid moving around the pasture to graze. Chapter 13 will provide a detailed look at alpaca conformation.

The Circulatory System

The circulatory system is the network responsible for moving blood around the body.

There are five components:

1. **Blood** carries nutrients to the cells, tissues, and organs of the body. It also carries waste products away. There are special cells in blood that have specific jobs. Generally, red blood cells carry oxygen from the lungs to the cells, and white blood cells help to fight infections. Blood tests performed in a laboratory can help identify what is wrong with an alpaca when it is sick.
2. **The Heart** pumps the blood to the lungs and to the body tissues.

The Blood Vessels are the tubes that carry the blood out to the body and then back to the heart

3. **The Arteries** carry the blood away from the heart to the lungs and body tissues.
4. **The Veins** carry blood back to the heart from the lungs and body tissues.
5. **The Capillaries** are very tiny blood vessels that help to distribute materials in the tissues and to the cells. They are the microscopic connectors between arteries and veins and are the location where oxygen and nutrients are distributed and wastes and carbon dioxide leave to be expelled by the body.

The Respiratory System

The respiratory system is responsible for moving air in and out of the lungs so that oxygen and carbon dioxide can be exchanged between the body and the air. The respiratory system has several parts:

1. **The Mouth and Nose** are the entrances to the respiratory system. Alpacas are called obligate nasal breathers. This means that they generally do not breathe through their mouths but breathe through their noses almost all the time. When you see an alpaca breathing through its mouth, it usually means that it is in some type of distress. Alpacas can be born with a birth defect called choanal atresia where the space leading from the nose to the tube down to the lungs is blocked. Sadly these animals cannot survive and must be euthanized.
2. **The Pharynx** is the space in the back of the alpaca's mouth and nasal cavity. It is the passageway for food to go down to the stomach and for air to move in and out of the lungs.
3. **The Trachea** is also known as the windpipe. It is a tube that runs from the pharynx, down the neck, and to the first tubes of the lungs. An alpaca's trachea is much longer than a human's because their neck is so long. The trachea has special cartilage rings that keep it from collapsing.
4. **The Lungs** of alpacas consist of two organs. The lungs help exchange oxygen and carbon dioxide with the blood. Tubes carry the breath to tiny spaces where this exchange occurs.
   - **The Bronchi** are the tubes connected to the trachea that carry air in and out of the lungs.
   - **The Bronchioles** are the smaller tubes that carry air in and out of the deeper parts of the lungs.
   - **The Alveoli** are the tiny sacs where the air and blood exchange oxygen (O_2) and carbon dioxide (CO_2).

5. **The Diaphragm:** This large muscle separates the chest cavity from the abdominal cavity. As it contracts and relaxes, it makes the lungs inflate and deflate.

One way to think about the respiratory system is that it resembles an upside-down tree! The mouth, nose, and pharynx are the base of the tree, the trachea is the trunk, the bronchi are the big first branches, and the bronchioles and alveoli are the smaller branches and leaves.

Nervous System

Even though there is little that you need to know about the nervous system of alpacas, it is still extremely important. Without the nervous system animals would not be able to think or move, the heart would not be able to beat, and all other parts of the body would not be able to work together.

There are three major parts:

1. **The Brain** that is located within the skull and is responsible for thinking as well as serving as the computer that allows all the other systems to work together in harmony.
2. **The Spinal Cord** leaves the brain at the base of the skull and is a big bundle of nervous tissue that runs within a protected space in the bones of the neck and back. It is responsible for conducting signals to and from the brain, and between the alpaca's muscles and organs.
3. **The Nerves** are the individual "wires" that conduct the signals from the brain and spinal cord to all the different parts of the body.

Integumentary System

Integumentary is a big, fancy word for the wrapping and strapping that holds everything together.

The integumentary system includes:

1. **Skin** is the biggest part of the integumentary system.
2. **Hair, or fiber**, as it is called on alpacas.
3. **Toenails** are found at the ends of the two toes on each alpaca foot.

The Integumentary system serves many purposes that we often don't think about:

- It helps to hold our body together so that our organs do not fall out of our belly onto the floor.
- It keeps us from losing too much moisture.
- It serves as a barrier protecting us from germs.
- It protects our muscles and organs from injury.

- It keeps us warm.
- It allows us to cool ourselves through sweating.
- Animals use their toenails for traction, protection and eating.
- It produces Vitamin D.

With alpacas one of the most important things about the alpaca's integumentary system is the fiber. Each year we shear our animals to harvest their beautiful fleece. We discuss alpaca fiber/fleece in Chapter 14.

The Urinary System

The urinary system serves to eliminate waste products from the alpaca. Again, we won't go into much detail here because alpacas rarely have any problems with their urinary system, but it is good to understand the anatomical parts because they are very similar to ours.

- **Kidneys** are located on either side of the spine in the lumbar area close to the pelvis. The kidneys filter blood removing wastes and water from the circulation. The liquid waste is called urine.
- **Ureters** are hollow tubes that carry urine out of the kidneys and down to the bladder. Each kidney has one ureter.
- **Bladder** is a hollow sac that sits in the pelvis and collects the urine. It can expand to accommodate the urine and is contracted to expel its contents.
- **Urethra** is the tube that carries urine out of the body from the bladder. In the male the urethra passes to the outside through the penis. In the female the urethra empties at the outside edge of the vagina.

The Endocrine System

The endocrine system is an amazing network of glands and hormones that tell the different systems how to behave. Hormones are special chemical signals that stimulate cells to act a certain way. The hormones are secreted directly into the blood stream and travel to their target. There are five glands that you may have already heard of:

1. **The Pituitary Gland** is located deep in the center of the skull. It is referred to as the master gland because it secretes hormones that tell the other glands what to do.
2. **The Thyroid Gland** is located high in the neck just below the jaw or mandible. The thyroid secretes hormones that influence the energy levels or metabolism of the alpaca. Rarely, a young alpaca may fail to grow properly. This could be caused by a

low level of thyroid hormones.

3. **The Adrenal Glands** are located on top of the kidneys and produce many different hormones that affect metabolism, water balance in the blood, sex hormones, and the hormones related to stress. The hormone adrenaline that is released when you get scared and makes you shake is produced by the adrenal gland.
4. **The Ovaries** are part of the female reproductive system. The ovaries are where eggs are produced, but they also produce the hormones that influence pregnancy.
5. **The Testes** are part of the male reproductive system. They produce the sperm which fertilize the egg to create a baby. The testes also produce a hormone called testosterone that influences the rest of the body to become more masculine.

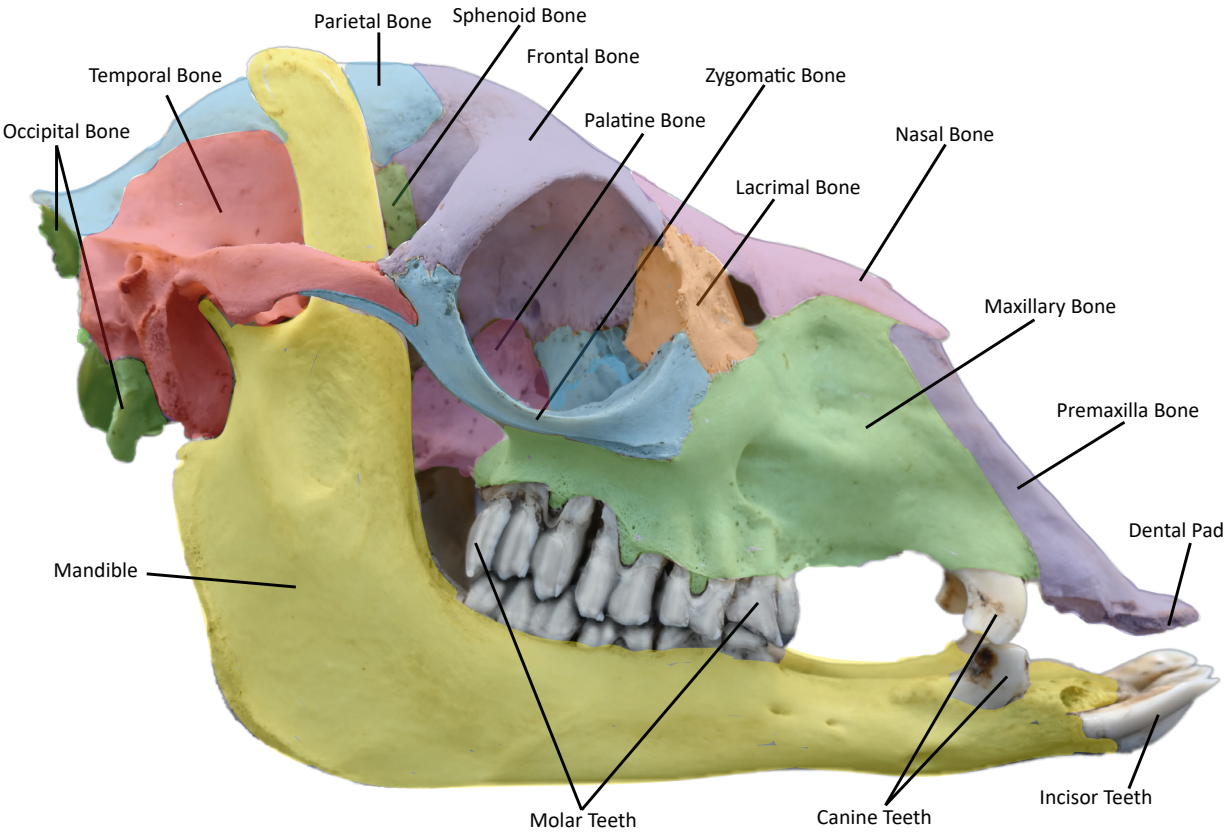
The Reproductive and Digestive systems both have their own chapters in this handbook.

What You Should Know

- The Skeletal System is responsible for:
  1. Giving structure to the body,
  2. Protecting vital organs, and
  3. Making blood cells.
- Alpacas and humans have many of the same bones, but some are shaped differently.
- The Muscular System is responsible for movement. Muscles attach to bones and by contracting and relaxing, they coordinate our movement.
- The Circulatory System is responsible for moving blood around our body to supply nutrients and oxygen, and to remove waste.
- The Circulatory System has three major parts: blood, heart, and blood vessels.
- The Respiratory System is responsible for moving oxygen into our bodies and carbon dioxide out.
- There are five major parts of the Respiratory System: mouth and nose, pharynx, trachea, lungs, and diaphragm.
- The Nervous System is responsible for carrying the signals to and from all of the different parts of the body.
- There are three major parts of the Nervous System: brain, spinal cord, and nerves.
- The Integumentary System is one of the most important because it includes the skin and hair or fiber.
- There are three parts of the Integumentary System: skin, fiber, and toenails.
- The Urinary System removes waste from the body.
- There are four parts of the Urinary System: kidneys, ureters, bladder, and urethra.
- The Endocrine System consists of several glands that produce hormones — chemicals that affect different parts of the body.

CHAPTER 9

The Alpaca Digestive System: Anatomy, Physiology, and Common Problems



Introduction

This chapter explores the alpaca digestive system and its ability to convert plants into the energy and building materials essential for growth, reproduction, and fleece development. Understanding the digestive system is crucial for determining the best diet to keep alpacas healthy and fit, a topic that is covered in this chapter. Additionally, the chapter addresses various issues that can arise within an alpaca's digestive system. Fortunately, alpacas are generally healthy animals that seldom encounter the problems discussed here.

Parasites of the digestive tract are always a potential problem for alpacas, just as they are for other livestock. Chapter 12 is dedicated entirely to this topic, so it will not be covered here.

Alpaca Digestive System Anatomy

The digestive system is one of the most

fascinating parts of an alpaca. It begins at the lips and ends at the anus (where alpaca poop comes out). Alpacas are different from us in their digestive anatomy because they only eat plants. This means that their digestive system organs look and act a bit differently than ours.

Alpacas are herbivores which means that they only eat plants and do not eat meat. Alpacas are also pseudoruminants which means that they have a digestive system that is somewhat different from true ruminants. Cows, deer, antelope, sheep, giraffes, and goats are all true ruminants and have a special stomach with 4 compartments. These compartments contain microscopic organisms that help them to digest plants. Alpacas have a stomach with three compartments and also have microscopic organisms that assist in digestion. Both alpacas and their ruminant cousins chew a cud or ruminate.

Mouth

We all know what the mouth is. It is the space used by both the digestive system and the respiratory system (and helps with communication). Alpacas have a long soft palate or roof of their mouth and therefore, are OBLIGATE NASAL BREATHERS. This means that they normally do not breathe through their mouth, but only through their nose. Mouth breathing may indicate a medical problem.

Cud or Spit

While cud isn't a part of an alpaca's anatomy, it plays a significant role in the care of these animals from an owner's perspective. Many alpaca owners can recall the rite of passage of receiving a surprise green, smelly blast of alpaca spit—often right in the face! Fortunately, this usually occurs only when an alpaca is provoked. With experience, owners learn techniques to avoid such spitting incidents.

When an alpaca is upset, they will usually shoot a "blank" at first (a warning shot over the bow, so to speak). Most of the time they only spit at fellow alpacas when arguing over feed, when boys are acting like stupid males do (yes, this is being sexist), when girls are acting like pregnant grumps, or when you are doing something they don't like such as shots or shearing.

After spitting, alpacas often walk around with a droopy, drippy lower lip. This can be quite unappealing, giving them a look that resembles mouth breathing. This frightens the uninitiated into thinking the alpaca has rabies or a terrible respiratory disease, especially due to the vibrant green mucus. Thankfully, this dramatic appearance is temporary. After a short while they will return to normal.

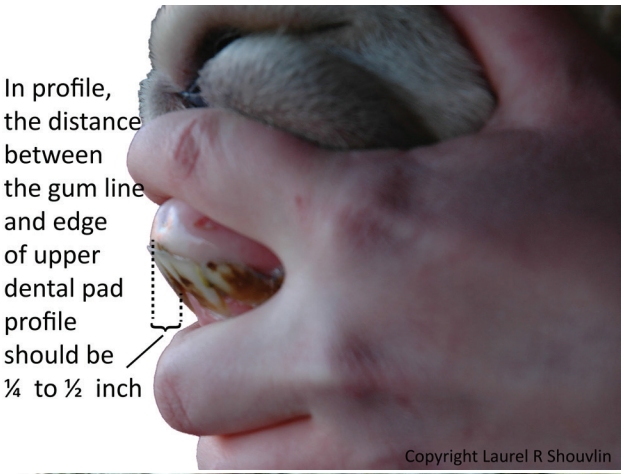
Lips

Alpacas have expert lips. The upper lip is divided by the philtrum and each half is able to move separately and manipulate food. They can wiggle each half of their lip so that they can pick and choose which blade of grass or leaf of a plant they actually nip off and eat. This allows alpacas to be much more choosy about what they eat when you compare them with some other livestock species.

Teeth

You probably did not know that many farm animals do not have front teeth in the top of their mouth. They only have teeth called incisors in front on the bottom. Alpacas only have a gum on the top of the front of their mouth. In the back of their mouth they do have teeth called molars on the top and bottom, just like us. See the photograph of an alpaca skull and lower jaw or mandible.

The presence of lower incisors at birth is an indicator of gestational maturity. If the incisors are not present at birth, it implies dysmaturity or



prematurity. Like humans and other mammals, alpacas have "baby" or deciduous teeth which they lose and replace with adult or permanent teeth. Most have all of their permanent teeth by age three or four, but some can acquire them as late as age six. It is not unusual to have both baby and adult incisors at the same time, but the deciduous teeth should eventually fall out. If they do not, you may have to have them pulled. This can be done quickly and easily by your veterinarian without any anesthesia.

As the alpaca grows and ages, its incisors continue to grow for quite a while because as the animal grazes, it wears them down. The incisors must meet the upper dental pad correctly. If they do not the teeth do not grow out correctly, get too long, and make it difficult for the alpaca to tear off and eat grass. They also look goofy!

When the teeth do not line up properly with the upper dental pad, they may have to be trimmed back. This can be done with a grinder or a cutting tool and is often taken care of when the alpaca is restrained for shearing. Breeders should avoid breeding alpacas that have bad bites because it hinders them grazing well when the teeth get too long, and adds another chore to the husbandry list.

Part of the evaluation a judge performs at halter shows is to check if an alpaca's front teeth align correctly. The exhibitor must part the lips so that the judge can see the alpaca's front teeth. Three photos of alpaca bites are provided. The top photo shows a properly aligned bite. The second shows an underbite or brachygnathia where the lower jaw is too short and too wide. The bottom photo demonstrates prognathia where the lower jaw is too long.

The molars in the back are used to grind food to a more digestible texture. Because of the extreme side to side motion when chewing

the cud, alpaca molars often maintain length appropriate for chewing. They rarely need to be "floated" as do horses' teeth unless they are showing signs of difficulty chewing. A veterinarian can assess sharp or worn teeth that might need attention.

Canine teeth are present and prominent in males. Females have them as well, but they don't use them. The canines first appear between the ages of one and a half to two years. The canines must be cut to keep the males from emasculating each other or slicing each other's ears as they fight and wrestle. They are present on the top and the bottom just behind the incisors and vary in number from one to three. The canine teeth will continue to grow as do the incisors, but are not as threatening once they have been cut.

An interesting fact is that the absence or presence of enamel on the incisors is a means by which they separated the New World Camelids into two groups. Alpacas and vicunas only have enamel on the lip or buccal side of their incisors and llamas and guanacos have enamel on both sides.

Tongue

An alpaca's tongue may not seem particularly remarkable, but it is somewhat unique. It is not very mobile and is rarely seen unless someone opens the alpaca's mouth. Typically, alpacas do not lick objects.

The Salivary Glands

Alpacas have salivary glands similar in size to goats, sheep and cows. Like us, they have three pairs of salivary glands, the parotid, the mandibular, and the sublingual. The saliva produced is responsible for lubricating the food, but also contains some enzymes which help to start the digestive process.

Esophagus

The esophagus is a long tube that runs from the back of the alpaca mouth to the stomach. As alpacas chew their cud food moves back and forth between the stomach and mouth through the esophagus. When an alpaca has been recently shorn, on the left side of the long neck, you can see the food move back and forth between the stomach and mouth as the alpaca swallows or brings up its cud. This movement is caused by coordinated muscle contractions called peristaltic waves.

Rarely, an alpaca might consume its supplement too quickly. The food can then block the esophagus causing choke. When this happens the alpaca stops eating, becomes restless, and appears to start vomiting. Usually the alpaca can clear this blockage by itself if you give it a few minutes. If it doesn't, it may be helpful to massage the left portion of the neck, starting at the top and pushing firmly all the way down to where the neck ends at the chest. If that does not work, a call to your veterinarian is your next step.

If an alpaca does experience a choke, it is wise to keep an eye on them for a few days. It is always possible that some of the fluid could get into the lungs and cause pneumonia, but this is rare.

Stomach

The stomach is the alpaca's powerplant and is an amazing organ that is due much more consideration and respect than we usually give it. Alpacas are often considered and treated as ruminants, however they are not true ruminants because they do not have four separate stomachs as do cows, sheep, and goats (the rumen, reticulum, omasum, and obamasum).

The alpaca stomach is very different from ours because alpacas only eat plants. Getting

all of their energy and nutrients from plants requires a different design. Our stomach is a single bag like organ almost twice the size of our fist. An alpaca stomach is much larger and has three compartments (Compartment 1, Compartment 2, and Compartment 3)(rumen, omasum, and obamasum).

- **Compartment 1 or C1:** This is the first chamber into which food is dumped from the esophagus. It makes up approximately 83 percent of the stomach in the adult alpaca. There are two areas, the cranial sac (closer to the head) and the caudal sac (closer to the tail). It is a large fermentation vat and sits on the left side of the animal. C1 is much more motile than its counterpart in true ruminants. It has a barely acidic pH of 6.4 to 7.0, and during rumination it contracts three to four times per minute.

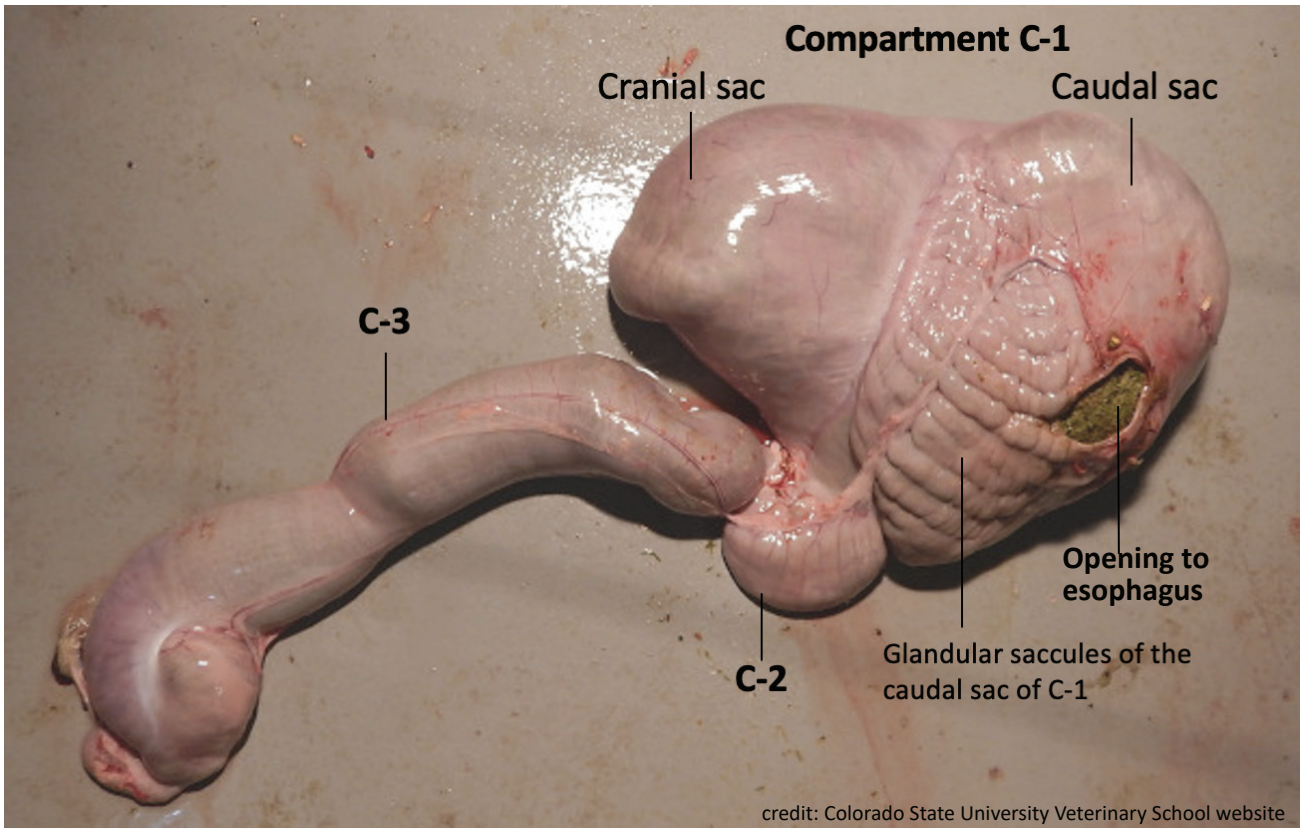
  After grazing, C1 gets filled with the grass or hay and when the alpaca feels full, they cush (lay down with their legs folded under them) and begin to chew their cud. This is called ruminating and the animals that ruminate are called ruminants. To ruminate, the alpaca will regurgitate (vomit) the contents of Compartment 1 back into their mouth and use their molars (back teeth) to chew the cud over and over again like we would chew a piece of gum. They then swallow the cud and regurgitate it all over again, back and forth, over and over again, making the food particles smaller and smaller each time.

  Compartments 1 and 2 of the alpaca stomach are a vat of bacteria and fungus that naturally live there. These organisms help the alpaca to digest or break down that food even more, and as they do so, they release the carbohydrates that the alpaca needs for energy. The alpacas ruminate to grind the food into small enough particles so that the stomach organisms can digest all of it. The function of C1 is to ferment the food, absorb water, and absorb volatile fatty acids and other solutes.

- **Compartment 2 or C2:** This is the second chamber which connects C1 to C3 and makes up approximately 6 percent of the stomach. The pH of this region is 6.4 to 7.0 as well. Once the contents of C1 have been ground small enough and the alpaca is finished ruminating, the contents pass into Compartment 2 where special chemicals called enzymes are mixed in with the cud. Enzymes are another way that the alpaca's digestive system breaks down the plant material to make as much as possible available to provide energy.

  C2 also serves as a fermentation vat, has numerous folds or papilla, and is lined with glandular tissue that secrete enzymes. It contracts less than C1. Its function is to ferment the food, add more digestive enzymes, absorb water, and absorb more of the volatile fatty acids and other solutes. Fermentation of the stomach contents is completed in C2. The remaining mixture of food, micro-organisms, and enzymes then travels to Compartment 3.

- **Compartment 3 or C3:** This last chamber connects the stomach to the small intestines and makes up approximately 11 percent of total stomach. It is long and more tubular than C1 and C2 and is the portion most similar to the human stomach. C3 possesses special cells that secrete acid and more digestive enzymes. The pH of first portion of C3 is 6.5 and last portion is 2.0 to 3.0 which is very acidic.



The stomach of an adult alpaca showing the three compartments.

This acidity makes C3 more prone to ulcers than other parts of the stomach.

In this compartment acid is used to help break down protein in the cud. Plants do not have enough protein for alpacas to survive on, so where does the protein alpacas require come from? The protein comes from the bacteria and fungi that helped digest the food! It is an amazing and efficient system to guarantee that alpacas get everything they need to survive.

The Cria Stomach

As an alpaca grows from cria to adult, it is interesting that the stomach changes. Crias are born with stomach compartment proportions much different from what they evolve to in the adult. At birth Compartment 3 is proportionally larger than the other compartments. This provides the acid environment needed to digest milk which is its main source of nutrition and loaded with protein, fat, and milk sugars. C3 makes up 60 percent of the stomach at birth and C1 is proportionally much smaller than what it becomes in the adult, only making up 25 percent of the stomach.

Another ingenious part of the design is that at birth, a special groove exists in the stomach that shunts the milk directly to C3, avoiding C1 and C2 altogether. As the cria ages and its diet begins to include forage, the proportions gradually change to achieve proportions of an adult.

The Small Intestines

When the remaining food material leaves Compartment 3, it passes into the small intestine, which is responsible for absorbing even more

nutrients. The food is also mixed with enzymes from the gallbladder to break it down further. The small intestine absorbs not only some nutrients but also primarily water, vitamins, and minerals. Alpacas are unique in their ability to absorb urea from the gut, a process that occurs in the lower digestive tract. Urea contains nitrogen, which is a building block of protein. This adaptation helps camelids survive on sparse vegetation. The small intestine consists of three sections, totaling approximately ten feet in length: the duodenum, the jejunum, and the ileum.

The Large Intestines

Leaving the ileum, food then passes into the large intestines. The main function of the large intestines is to retrieve water from the digestive matter. The left overs are then sent on to the rectum where the food has been reduced to small beans that are passed through the anus and onto the poop pile.

Because alpacas are from an area of the world where water is scarce, their intestines are extra long to enable them to remove as much moisture as possible. There are five sections of the large intestine—the cecum, the spiral colon which has five coils of intestinal loops (almost twice that of cows), the transverse colon, the descending colon, and the rectum.

The Rectum

This last section of the large intestines is the final passageway for feces to exit the body. It is large enough that it can allow the passage of a small hand for palpation of the uterus. Alpacas produce beans that usually fall separately to the ground, but can fall out in a clump that will break apart relatively easily. Because of the efficiency of mastication, rumination, digestion, and moisture removal, these are great fertilizer for the garden!

The Liver

The liver has many functions, and we mention it here because it is an accessory organ of the digestive tract. Its principal purpose is to filter toxins and waste products from the blood, but it also functions in fat and sugar metabolism. The material filtered by the liver is drained into the bile duct which in turn empties into the duodenum (small intestine). The bile created by the liver helps digest fats. The liver can be a source of problems with specific conditions:

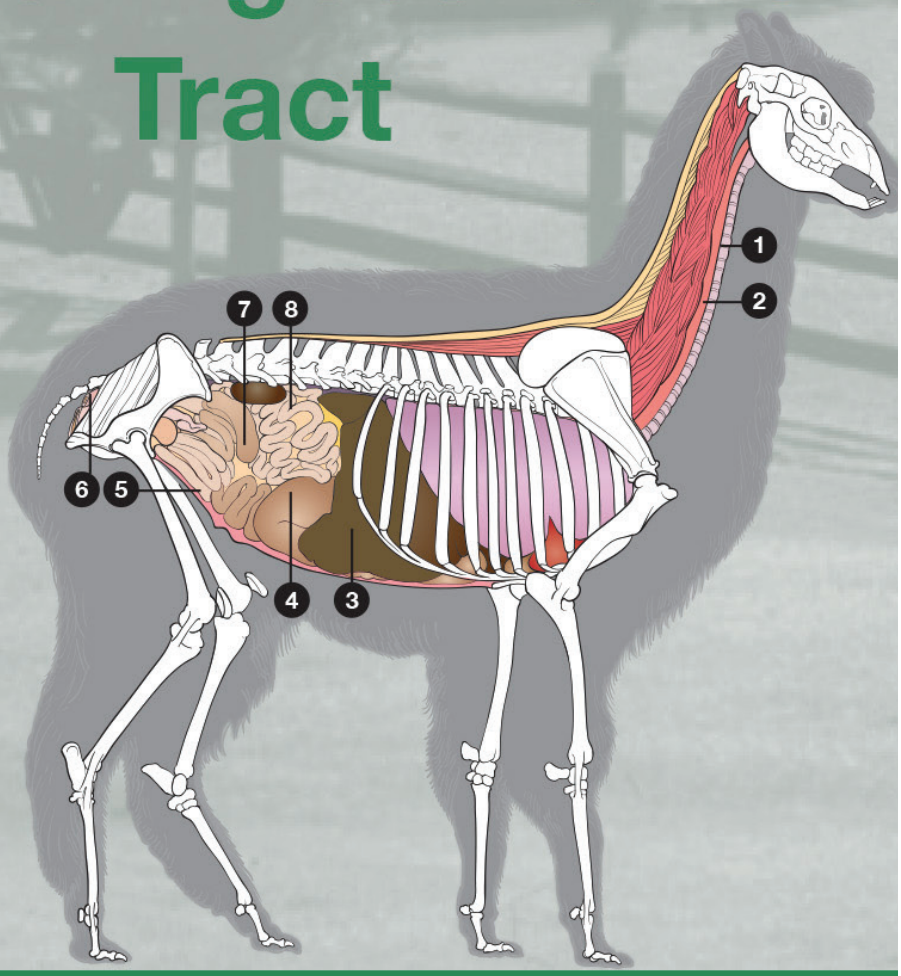
- Liver Flukes
- Fatty Liver Disease
- Infection (bacteria, virus, fungus)
- Cancer
- Poisoning

The Pancreas

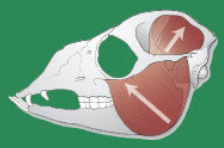
This is another accessory organ of digestion. It is responsible for secreting enzymes to aid with digestion. The pancreatic duct empties into the bile duct, which then empties into the duodenum (small intestine) where these enzymes further act to break down the food and make the nutrients available. The pancreas is also responsible for the production of insulin

> Most of us don't realize that we really aren't feeding the alpaca, but we are feeding the microorganisms that live inside the alpaca!

Alpaca Digestive Tract



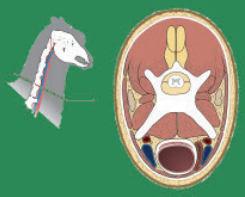
Highlights



$2(I\frac{3}{3}\,C\frac{1}{1}\,P\frac{4}{4}\,M\frac{3}{3})=44$

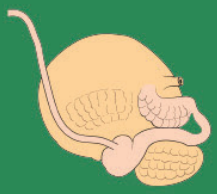
Teeth

The alpaca uses its incisive teeth to cut forage. The premolars and molars grind the food prior to swallowing.

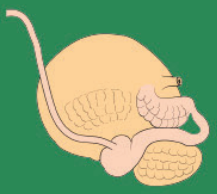


Esophagus

The esophagus carries food from the mouth to the stomach. It travels on the left side of the neck beside the trachea. A gastric tube will feel like a second firm tube on the left if it is correctly placed.



adult stomach

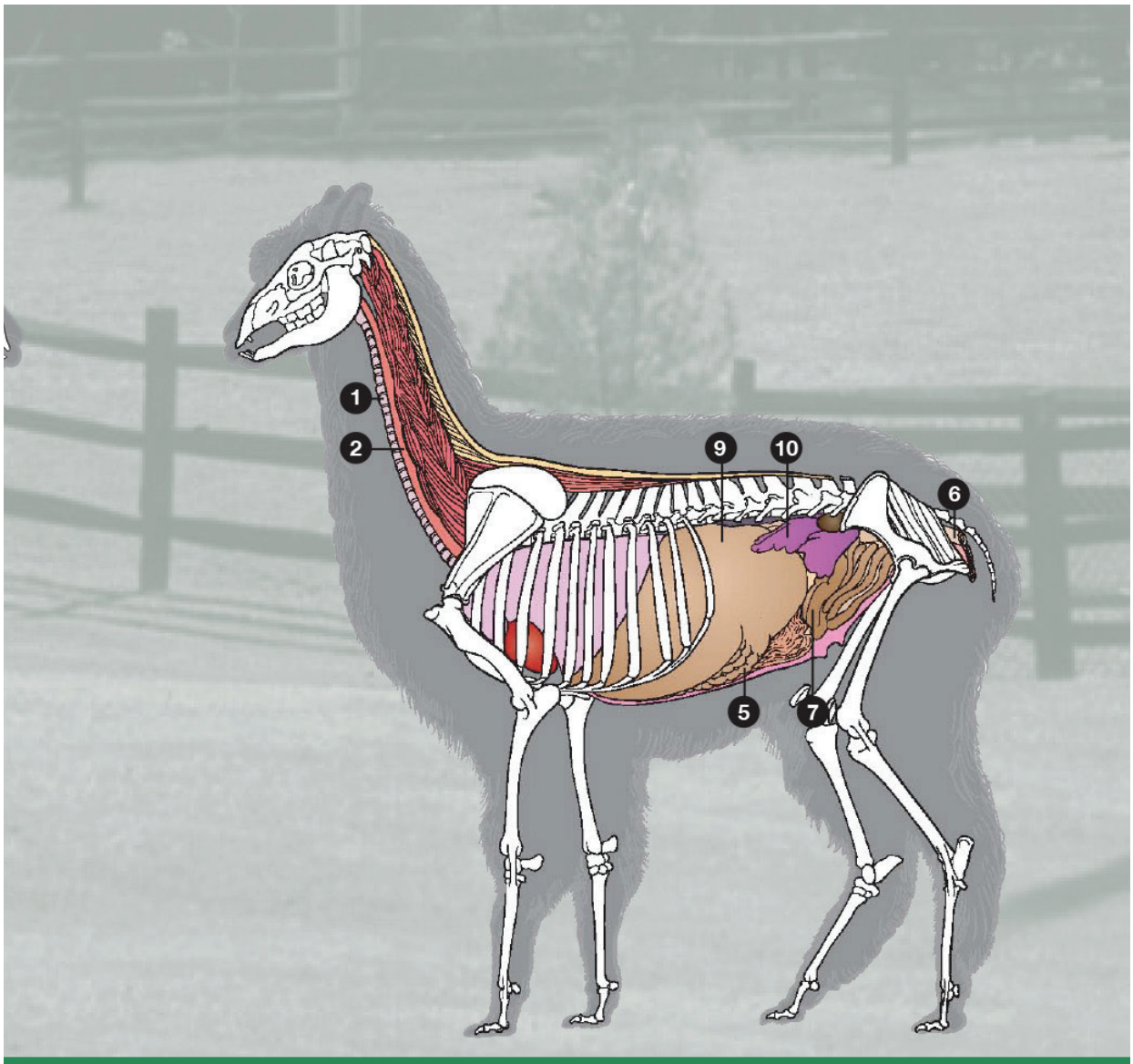


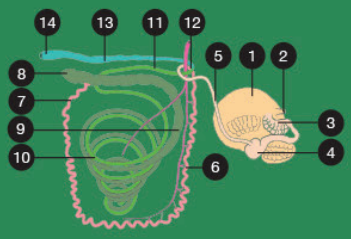
cria stomach

Stomach

The stomach of the alpaca is divided into three compartments. Food enters the first compartment, is broken down by bacteria and regurgitated up to the esophagus to the mouth to be chewed as cud.

In the nursing cria, milk bypasses the first and second compartment and is directed into the third stomach. This avoids undesired fermentation of the milk.





Digestive Tract

1. compartment 1
2. esophagus
3. compartment 2
4. compartment 3
5. duodenum
6. jejunum
7. ileum
8. cecum
9. proximal loop
10. spiral loop
11. distal loop
12. transverse colon
13. descending colon
14. rectum

Key

1. trachea
2. esophagus
3. liver
4. compartment 3
5. spiral colon
6. anus
7. large intestine
8. small intestine
9. compartment 1
10. spleen

which is vital to controlling the movement and storage of sugar within the bloodstream and the body's cells.

The Omentum

The omentum is not an organ, but it plays a crucial role as a fan-shaped web of connective tissue that helps organize and stabilize the abdomen. This tissue supports the blood vessels that nourish the digestive system and transport nutrients.

Physiology of Digestion

Rumination

Ruminants are unusual in the animal kingdom because their design allows them to utilize very low quality food to sustain themselves. This is possible due to a symbiotic relationship that exists between an alpaca and the microorganisms that dwell in its stomach. Rumination is the act of "dwelling" on one's supper. The alpaca (which actually is not a true ruminant, but behaves like one) grazes, chews, and swallows food. It then repeatedly regurgitates the food from the C1 part of the stomach to its mouth where is grinds it into finer particles with each passage back to the mouth. This happens over and over again. This also mixes the food with saliva and the digestive juices that contain the micro-organisms.

This rumination and grinding enables the organisms to have more surface area to attack the food and digest it. Additionally C1 and C2 are very motile compared to true ruminants, mixing everything well, which also increases contact of the organisms with the food.

The various organisms in the stomach (bacteria, protozoa, and fungi) utilize and digest the grass, hay, or alpaca chow into usable products that are absorbed by the alpaca stomach and small intestine. The same types of micro-organisms found in your alpaca's stomach are also found in cow, goat, sheep and deer stomachs.

A photo of a rumen donor at Ohio State University Veterinary Hospital. A special port placed in the cow's side allows veterinarians to acquire fresh rumen to place in the other ruminants digestive tracts. This is called transfaunation.

This makes it possible to **transfaunate** an alpaca with another ruminant's stomach contents, introducing a healthy dose of organisms to get the stomach back on track after illness or treatment with antibiotics. Transfaunation means you take some of the contents of one animal's stomach and put them into the stromach of another animal using a tube placed down the esophagus and into the stomach.

A cria is not born with these organisms in its stomach and initially does not have the ability to ruminate. This ability develops as they ingest organisms when they start to eat hay or pasture. You may witness an alpaca mom "kiss" its young cria. This may serve as a mechanism of transfaunation.

Fermentation

This refers to the microorganism activity of breaking down food. Without these microorganisms, the various plants would not be broken down into usable components for absorption. The balance of these organisms in the gut is affected by the diet, and will vary as the diet varies. Just as fermenting beer will create certain gases and compounds, so will fermentation in the stomach. Alpacas are capable of utilizing these fermentation byproducts. Carbohydrates are utilized by the organisms for growth and energy, which is good because the more microorganisms that are grown, the more byproducts they create for the alpaca to utilize. After all their hard work, the organisms are passed on to C3.

The bacteria, fungi, and protozoa are broken down in the alpaca's C3 to serve as the source of protein. Plants possess little protein, much less than what is required for maintenance and growth of an animal. The alpacas eat to feed the factory of organisms in their stomach. These organisms are approximately 62 percent protein. They are digested in C3 by the acids and enzymes secreted there, and their protein is absorbed by C3 and the small intestines.

Symptoms Of Common Problems Of The Digestive System

Alpacas are often described as stoic, a trait that makes it difficult to tell when they are unwell. Because of this, it's essential to regularly observe your alpacas for any subtle changes in behavior.

It is important to get to know your alpacas and study their relationship in the herd. For instance, are they at the top of the pecking order, or do they wait for everyone else to finish before eating? Do they aggressively go after the food in the bowl, or are they easily pushed away? Are they the first in line going back to the barn, or the last, or somewhere in the middle? Do they completely avoid you? Do they mind you touching them?

If you know their regular behavior, then it will be easier to identify when they are off. Following is a list of some things to look for:

- Is the alpaca eating less than usual?
- Is the alpaca not as aggressive as usual?
- Is the alpaca laying down in the pasture while everyone else is grazing?
- Does the alpaca allow you to come near it, when usually they act like you are going to eat them for dinner?
- Are there other signs of them being "off"?
- Is there any sign of diarrhea?
- Are they defecating and urinating normally?
- Are they getting up and down more frequently?
- Are they rolling more than normal?
- Are they chewing a cud?
- Are they eating at all?
- Are they kicking at their belly?
- Are they grinding their teeth?
- Do they have a pained facial expression?
- Are they frequently shifting position when cushed or standing?
- Are they losing weight?
- Do they have a temperature?

Things That Can Go Wrong with the Digestive System (by Anatomical Part)

Mouth

- Tooth infections or abscesses are the number one cause of mouth issues. They are usually diagnosed by swelling of the jaw. This is definitely a time to involve your veterinarian, for treatment usually requires long term use of antibiotics and in some cases, removing the tooth. Consider a tooth infection if your alpaca starts to lose weight with no other obvious explanation.
- Stomatitis is a fancy word for an inflamed and sore mucosa (lining) of the mouth. This is an unusual occurrence. It may be caused by eating a toxic substance, catching a virus, or a disease called Orf. Orf is a condition where there are sores on the mucosa of the lips, gums, and inner cheeks. It is common in sheep. No treatment is known, however the author has had one alpaca that benefited from homeopathy.

Esophagus

- **Choke** is the most common problem involving the esophagus. Choke is an obstruction of the esophagus that prevents food from passing up or down. It is not a blockage of the airway. It is usually associated with eating crumble or pelleted feed too quickly. You can often visualize the location of the obstruction if you can see where the peristaltic wave stops.

  Choke may be relieved by:

  - The alpaca regurgitating and coughing and dislodging it itself. You can give the alpaca some time—5 or 10 minutes—to clear it themselves.
  - If the alpaca can't clear it, you can massage the neck of the alpaca in a downward motion, imitating the peristaltic contractions, and help break up the blockage manually.
  - If 30 minutes pass without clearing, it is probably time to call the veterinarian who can relieve the choke using a tube.

  Choke may be prevented by:

  - Providing enough feeder space so that alpacas do not feel they have to compete for feed.

- Place smooth stones or other obstacles in the feed trough so that gulping down feed is difficult.
- At feeding time, separate the choke prone alpaca from the others and feed it separately to keep them from feeling a need to eat rapidly.
- Dampen the food with water to get a mushy consistency which is more lubricated with the moisture.
- Try different feeds to see if that affects choking.

- **Megaesophagus** is an unusual condition where the esophagus is dilated, or larger in diameter that normal. This causes difficulty in moving the food down to the stomach and the alpaca frequently regurgitates. In some cases elevating the food bowl, dampening the food, and feeding the alpaca separately so that it doesn't feel as though it has to eat quickly can help these alpacas live long lives. Repeated episodes of choke in an individual alpaca may indicate they have megaesophagus. It is not a common condition in alpacas and it requires special x-rays with contrast to diagnose.

Stomach

Alpacas can get stomach aches just like us, and fortunately most of these do not last long. Regardless, you must keep a close eye on the alpaca that is "off." Any time an alpaca stops eating, you need to quickly figure out why.

Since the stomach is one part of a very long tube, anything happening along that tube can cause problems with the entire system. For instance, an obstruction of the lower GI tract will cause problems in the stomach, or a case of diarrhea will also cause loss of appetite.

- **Ulcers** are thought to be a somewhat common problem in alpacas, however their existence can only be proven or ruled out with a necropsy (the animal version of an autopsy). They occur in C3, the last and acidic compartment of the stomach. It is not known what causes ulcers but it is suspected that they may be caused by:
  - Stress
  - Bacterial infection (similar to ulcers caused by bacteria in humans)
  - Feed change

  Ulcer Symptoms may include:
  - Moving slow or separated from the rest of the herd.
  - Decreased appetite.
  - Rolling more frequently than normal.
  - Frequent visits to the poop pile.
  - Down alpaca grunting and groaning.
  - Teeth grinding.
  - Down with neck arched backward is a grave sign.

  There is no known prevention, but if an alpaca is going to be placed in a high-stress situation, it may be beneficial to prophylactically treat with anti-ulcer medications. It is also recommended to make feed changes gradually over several days.

  Contact your veterinarian if you notice any of the above symptoms, as they will need to examine, diagnose, and provide appropriate treatment.

- **Gastric Overload** is another term for overeating. If we eat too much at a holiday meal, it doesn't kill us, but an alpaca getting into a bag of feed and gorging itself on anything is potentially fatal.

If this happens, it is essential that you contact your veterinarian immediately, even if your alpaca is acting completely normal. Symptoms may take 12 to 36 hours to become evident, but gastric overload can result in impaction, acidosis of Compartment 1, and engorgement toxemia. The only treatment is to immediately call and involve your veterinarian.

Small & Large Intestines

- **Enteritis** simply means inflammation of the intestinal tract. The symptoms of enteritis usually consist of **diarrhea** and acting as though there is an upset stomach. Diarrhea is often self-limiting, but you should call your veterinarian if you are concerned or the diarrhea lasts for more than 24 hours or the alpaca is acting very uncomfortable or lethargic.

  Primary enteritis is caused by a problem located within the intestines. Some potential causes are:

  - Bacterial infection such as salmonella, colibacilla, and clostridia.
  - Ingesting toxins such as a poisonous plant.
  - Administration of antibiotics which can upset the balance of the microorganisms that live in the intestines.
  - Lush pasture such as green, spring pastures leading to loose stools.
  - Changes in feed or hay can upset the balance of the gastrointestinal system.
  - Parasites are also a very common cause of diarrhea. They can be identified by doing a fecal egg count. Worms and coccidia are two categories of parasites.

Pay close attention to crias with diarrhea for it can kill quickly due to dehydration!

  Secondary enteritis is caused by a problem from outside the intestines and digestive tract, such as:

  - Masitits (infected udder)
  - Uterine infection (bladder or kidney infection)
  - Upper respiratory infection

  Treatment of enteritis depends on its cause as well as the severity and length of time that the alpaca has been sick.

  - Call your veterinarian if you are concerned.
  - Diarrhea may resolve spontaneously.
  - Watch for dehydration and overall depression.
  - May require stool sampling for cultures and parasite evaluation.
  - Antibiotics may be helpful.
  - Transfaunation may be helpful.
  - Pay close attention to diarrhea in crias, as it can be rapidly life-threatening.

- **Obstruction of the Intestines** can occur in any part of the small or large intestines.

  The symptoms will be those of abdominal distress:

  - Restlessness
  - Decreased or absent appetite
  - Kicking at abdomen

- Rolling
- Grunting etc.
- Eventually, minimal or no fecal output.

There are many different causes of Intestinal Obstructions, and fortunately these rarely happen:

- Impaction of fecal matter
- Sand collic from eating sand while grazing
- Tumors
- Torsion (organs twist and close off intestines)
- Pregnancy imposing on digestive space
- Strangulated hernia
- In crias there can be congenital defect
- Rarely, alpacas will eat another alpaca's fleece which can cause a blockage.

- **Ulcerations of the Intestines** can occur anywhere in the intestines and the symptoms very similar to any other GI disturbance. Ulcerations usually follow some sort of enteritis or obstruction. Sadly, the diagnosis is made during a necropsy after the ulcers have perforated through the intestinal wall and caused peritonitis killing the alpaca.

Rectum

- **Rectal prolapse**s refers to the rectum protruding out from under the tail. It may be a partial prolapse where just some of the mucosa of the rectum protrudes or complete where the entire rectum protrudes. Prolapses are typically caused by excessive pressure within the abdomen such as with late term pregnancy. They can also be caused by an excessive episode of diarrhea. Treatment should be done by the veterinarian. Until the veterinarian can be there, the owner should attempt to keep the rectum as clean as possible. The swelling can be reduced by placing sugar on the prolapse. Replacement can be a challenge and a purse string suture may be necessary to keep it from prolapsing again.

- **Rectal lacerations** is a rare occurrence. A laceration or tear may occur secondary to a rectal prolapse, to male breeding the wrong portal, to instrumentation (ultrasounds), or to rectal palpation (hand inserted into the rectum).

Liver

The symptoms of liver disease will be vague. The alpaca may have weight loss and generally acting off. A raised body temperature may indicate an acute infection. Blood tests can confirm liver problems by checking the level of liver enzymes which is part of a general biochemical profile. Elevation of these enzymes indicates some problem exists, but does little more than that.

A complete blood count (CBC) can help to identify an infectious process. A liver biopsy, usually done at a veterinary hospital can help with diagnosis by examining tissue from the liver. Tissue can be analyzed for infection (cultures can be performed), fatty liver disease, cancer, or toxins.

- **Fatty Liver Disease** is not completely understood but seems to be associated with times of stress. In fact, all of the cases that have been confirmed at necropsy have included some stress component. For reasons unknown, when faced with stress, fat stored in the body is shifted to the liver's cells. These cells become overburdened and can't function normally. Stressors include:

- Late pregnancy
- Lactation
- Drastic food changes
- Weather changes (extreme cold or extreme hot)

Treatment of suspected fatty liver disease includes:

- Appropriate diet
- Reducing stress
- May need to assess the rest of the herd

- **Bacterial, Viral, or Fungal Hepatitis,** fortunately, is a very unusual occurrence in alpacas.
- **Parasite Infestation.** Liver flukes affect alpacas as well as other livestock. Different areas of the country are more prone to harbor flukes.
- **Cancer** can occur in alpacas, just like other mammals, but fortunately it is rare.
- **Toxic damage** occurs when the liver, which is primarily responsible for removing waste and toxins from the blood, is compromised. This damage can result from ingesting poisonous plants, consuming medicated feed harmful to alpacas, or receiving medication in a dose that is too large for the animal.

Pancreas

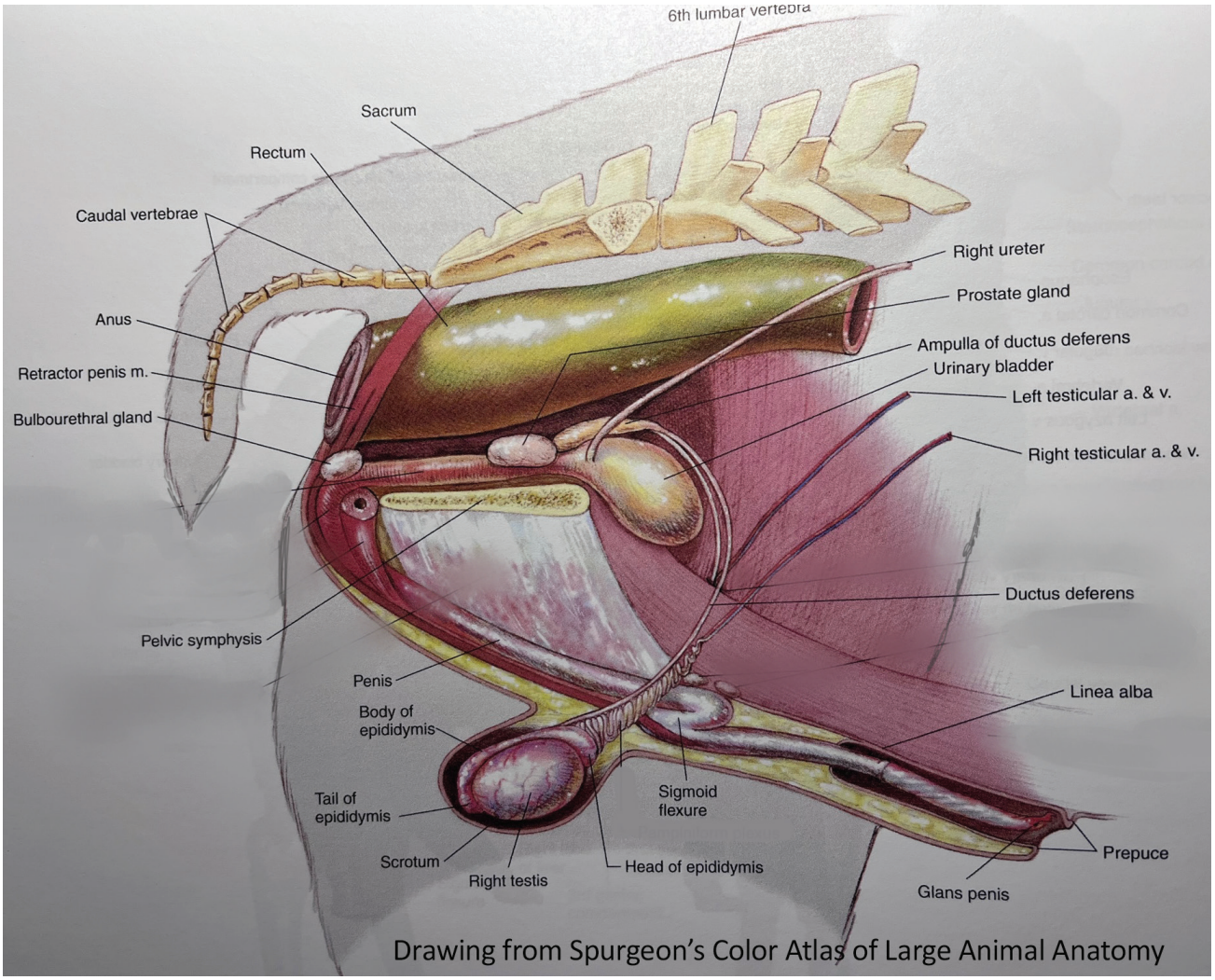
Fortunately, problems with the pancreas are very rare in alpacas as is diabetes.

What You Should Know

- **The Digestive System is responsible for converting food and water into energy and building blocks for growth.**
- **Know the parts of the digestive system: mouth, esophagus, stomach, small intestines, large intestines, liver, and pancreas.**
- **Know that alpacas are pseudoruminants and that they chew a cud.**
- **The alpaca stomach has three compartments.**
- **The alpaca stomach holds organisms called bacteria, protozoans, and fungi which help break down the food alpacas eat to provide the energy and materials alpacas need to survive.**
- **Know the list of symptoms that may indicate an alpaca may have a digestive system problem.**
- **Know the difference between a good and bad bite.**
- **Know what choke is.**
- **Know what diarrhea is.**
- **Know that it is important to store alpaca supplements in a secure location that the alpacas cannot get to and why.**
- **Know that alpacas need good quality pasture and/or hay as well as fresh water to stay healthy.**
- **Familiarize yourself with the section on what can go wrong with your alpaca's digestive system.**

CHAPTER 10

Alpaca Reproductive System



Drawing from Spurgeon's Color Atlas of Large Animal Anatomy

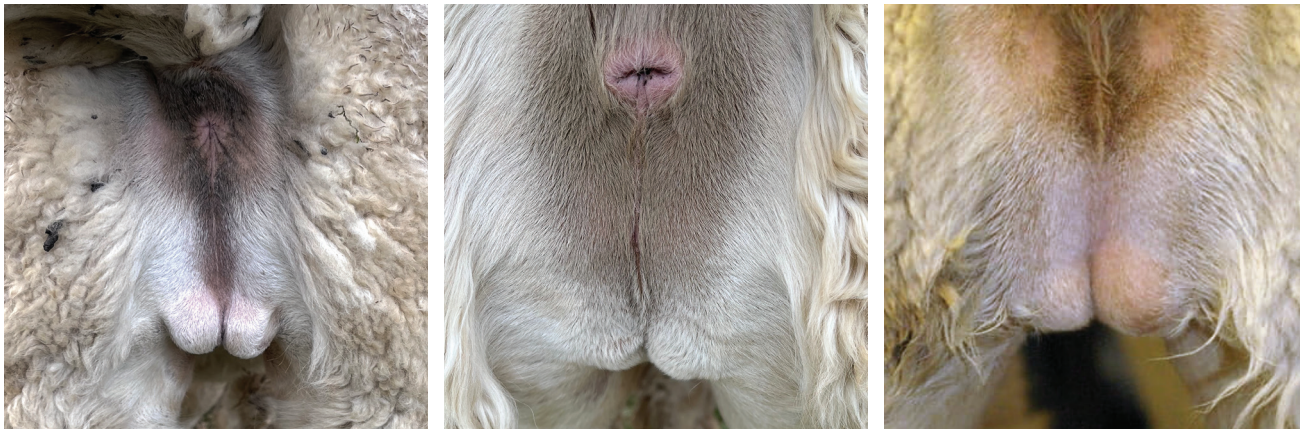
Introduction

The information provided here may be more suitable for older youth. If leaders wish to share this content with their club members, it is advisable for parents to read this chapter first to assess whether they feel the material is appropriate for their child.

Male Reproductive Anatomy

Penis

The alpaca penis is 35 to 40 cm long (14 to 16 inches) It is tucked up in the abdomen and shaped like an "S." The penis is held back in the sheath by a special retractor muscle that keeps it in its "s" configuration. The end of the sheath is known as the prepuce (foreskin) and until the



Pictured above: Normal testicles (left), small testicles (middle), hypoplastic or uneven testicles (right). The right hand photo taken by Dr. Ahmed Tibary and provided to Merck Veterinary Manual

alpaca male is mature, adhesions exist between the prepuce and the glans of the penis, keeping the penis retracted even if sexually aroused. Because of this, the penis is not visible until puberty. These adhesions make it impossible for young males to penetrate females at an early age, even if mounting occurs. These adhesions break down, presumably under the influence of testosterone as the male matures.

In the mature male, upon arousal at breeding, the "S" will straighten and the penis will extend becoming 14 to 16 inches long. This length is needed so that the penis can extend through the vagina, through the cervix, and deposit ejaculate into the female's uterus.

The penis also holds the urethra which is the tube that leads from the bladder to the outside. Urine flows out of the bladder through this tube. In the unaroused state, the prepuce (foreskin) points posterior, so that males urinate toward their back legs (caudal) as opposed to forward (cranial). The urethra is not located at the tip of the glans, but at its base of the glans.

The tip of the penis has a peculiar cartilaginous projection that resembles a worm. When the male is aroused, this projection appears to move independently. It is thought that this assists with the penis finding the female's cervix to pass through to deposit sperm in the uterus.

Testicles

Male alpacas are born with two testicles that are present in the scrotum. They are not much larger than a pea at this birth and sometimes they will move back and forth from the lower abdomen into the scrotum. The testicles are ovoid in shape and will continue to grow until the male alpaca becomes an adult sometime between 24 and 36 months of age.

Male alpacas carry their testicles much higher than other livestock. South American camelid males (vicuna, alpaca, guanaco, and llama) are prone to fighting, especially in the presence of a female that is ready to breed. Males have canine teeth that they use to try to tear out the testicles of other males. It is thought that natural selection has caused the testicles to stay closer to the body to provide protection.

Because the testicles are held so close to the body, alpacas are more prone to have them injured by heat extremes in summer weather. Timely shearing does a great deal to prevent this, but some breeders have waited too long to shear. Air is unable to reach the scrotum for

cooling. It then swells with fluid (edema) and the testicular tissue can subsequently become permanently damaged causing sterility. In hot weather alpaca owners should check their males to be certain there is no swelling.

Scrotal edema is more common when a male is moved from a cool environment to a warmer one, such as the mountain region of northern Colorado with low humidity, to South Carolina and high humidity. Wrapping tails and spraying the belly and scrotum with cool water can help prevent issues.

The testicles are proportionally smaller than those of other livestock, and measure 3.5 cm X 5.5 cm (1 X 1.5 inches). They should be equal in size and have a firm texture. As with other livestock, the larger the testicle, the higher the sperm count or fertility, however the alpaca and llama have relatively small testicles when compared to other livestock.

The testicles are responsible for producing the sperm which fertilizes the egg at breeding. The amount of sperm produced by males will vary over the course of the year with the lowest levels occurring in winter months. The material that is released into the female during breeding is called the ejaculate. It is a mixture of fluid from the prostate gland and the sperm from the testicle. Alpaca males do not create as much ejaculate as do other livestock species and the number of sperm in the ejaculate is smaller as well. The sperm of alpacas also move slower than those in other species.

Epididymis

There are three parts of the epididymis: the head or caput, the body or corpus, and the tail or cauda, which serves as the storage area for the spermatozoa. The epididymis serves as the collection system to carry sperm and fluids from the testicle to the vas deferens.

Vas Deferens

Serves as the connector between the epididymus and the penis or urethra. It is approximately 30 to 40 cm long.

Prostate Gland

The prostate gland is located between the bladder and the penis. It produces the fluid that mixes with the sperm to make the ejaculate.

Physiology of Male Reproduction

Puberty—Sexual Maturity: (ability to impregnate)

This occurs somewhere between ages two and three. There have been cases where a six month old has impregnated a female, but this is extremely unusual. Sexual maturity has as much to do with the release of the preputial adhesions as it does with spermatogenesis. Diet also affects how quickly a male will become sexually mature.

Sperm Production

Production of both testosterone and sperm are the role of the testicles. There appears to be some correlation between season of the year, testosterone levels and spermatogenesis. This has been seen in vicunas and llamas. Alpacas and the other new world camelids do not produce high quantities of sperm or ejaculate, and the viability of sperm is lower over time than many other livestock. These two facts make the use of artificial insemination and embryo transfer a bit more of a challenge.

Mating

Alpacas are willing and able to breed at any time of the year although it appears that fertility of both the female and the male is lower during the winter months. During mating, ejaculation

occurs throughout the breeding, with sperm being dribbled in the vagina and uterus over the entire mating. There is no relationship between length of breeding time and success of outcome. Breeding will take between 5 and 60 minutes. Generally, maidens will breed for less time than multiparous dams, and males will breed for shorter times if other males are nearby. It is generally accepted that males should be used only twice a day to breed females.

Semen Characteristics

Again, ejaculate volume is relatively small in alpacas, from 0.4 ml to 12.5 ml. Sperm concentration is highly variable, between 82,000 to 250,000 per cubic mm. Sperm motility in the ejaculate is low due to the viscous, almost gelatinous nature of the ejaculate. Additionally, sperm motility decreases in hot weather. In the fall and spring, approximately 75 to 80 percent of the spermatozoa are mobile, but this percentage declines to around 50 percent during the summer. Live and normal sperm will vary with weather as well, with live sperm around 80 percent in winter, spring, and fall, and dropping to 40 percent in the summer. Sperm characteristics will also decrease with age. Sampling ejaculate to assess fertility is done by swabbing the vagina or uterus post copulation. It may be blood tinged due to the damage done to the uterus during sex.

Male Reproductive Problems

Cryptorchidism

This is sometimes referred to as retained testicles. It refers to one, or both testicles, failing to descend into the scrotum and becoming trapped in the abdomen. The abdominal cavity is too warm to allow sperm to live, so a retained testicle interferes with a male's fertility. This is not an uncommon problem in alpacas and is a heritable or congenital defect, so that a male who is cryptorchid should never be used for breeding. Cryptorchidism is also linked with testicular cancer in other species.

Hypoplastic Testicles

This refers to the lack of development or growth of one or both testicles. One or both testicles are smaller than normal or one is markedly different in size than the other. This is also considered a heritable trait and these males are typically unacceptable as breeding stock.

Testicular Degeneration

In this situation the normal testicle becomes smaller. It may be boggy or mushy, or very fibrous and hard. In North America, degeneration most commonly results from excessive heat exposure, but it can occur from extreme cold as well. The result is decreased or absent sperm production. Testicular degeneration is preventable with good husbandry practices such as shearing, shade, and hosing during very hot weather.

Other Problems

Below are some less common issues with males:

- **Epididymitis:** relatively rare inflammation of the epididymus.
- **Testicular Cysts:** Diagnosed by ultrasound, may interfere with fertility.
- **Testicular Trauma:** Males try to emasculate each other. Retained fighting teeth can damage the scrotum or testicles of another male.
- **Testicular Tumors:** Rare.

Female Reproductive Anatomy

The female camelid is not that different anatomically from other mammals, but there are some important differences that have significance both when breeding and after the cria is born.

Perineum

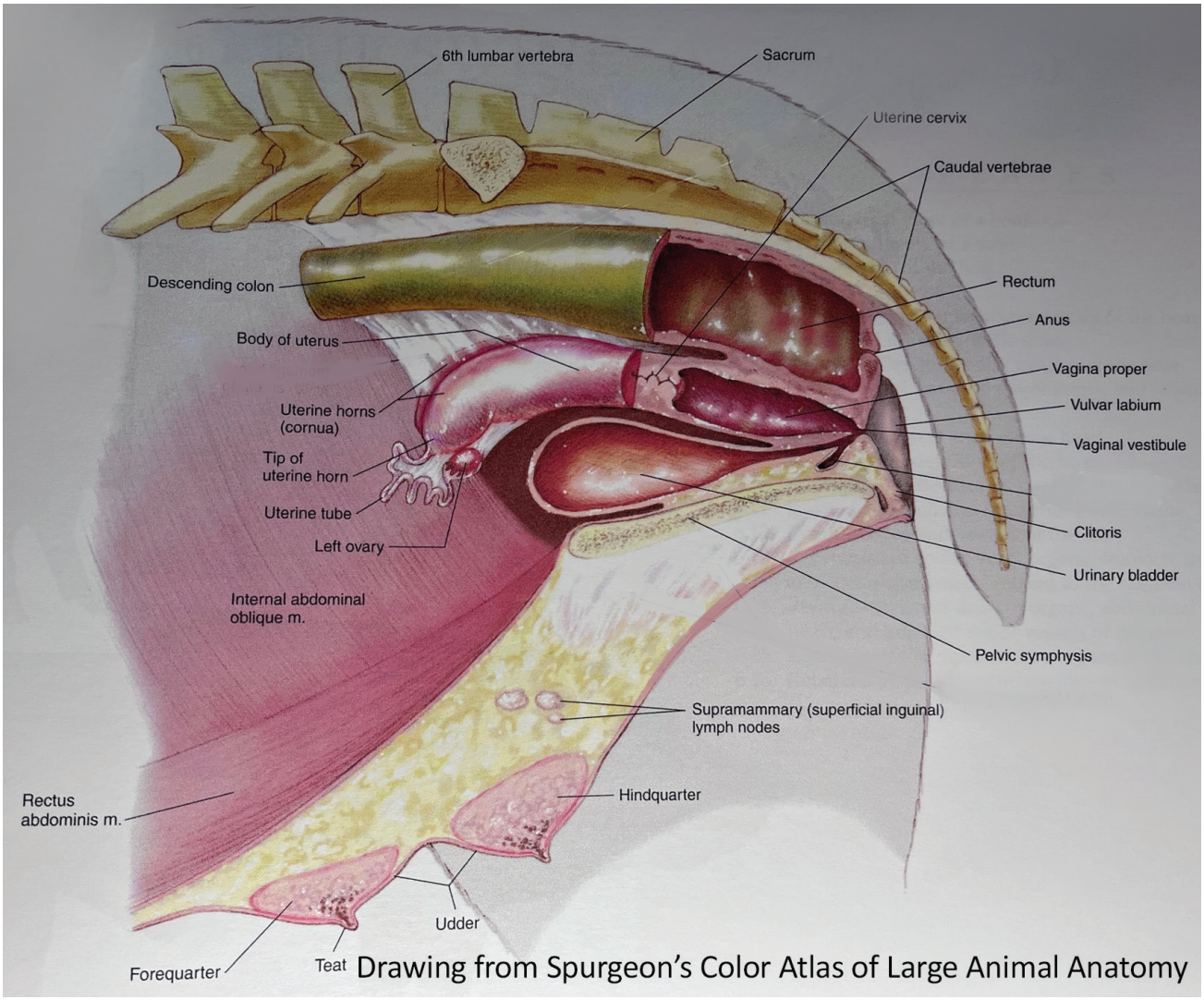
This is the region under the tail that includes the anus and the vulva or entrance to the female reproductive tract. The perineum should be close to perpendicular to the ground. In the latter weeks of pregnancy, it is very common to see this area bulging and moving as though the cria is knocking on the door to go outside.

Vulva

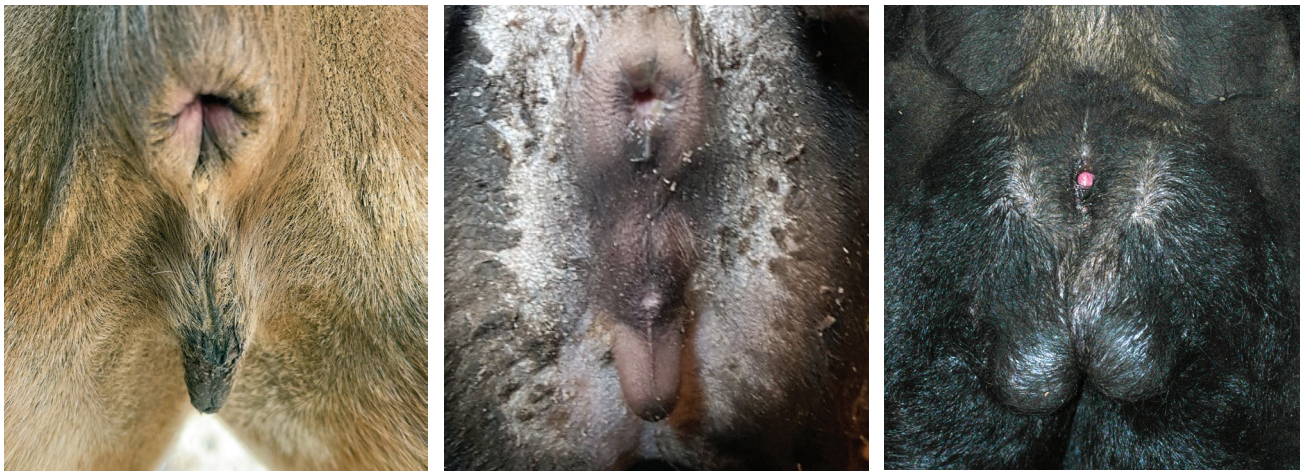
These are the external genitalia of the female. There are two vulva, one on each side of the opening into the female reproductive tract. The length of the slit between them is two to three inches long. There is a prominent clitoris at the lowest part of the vulva.

Hymen

The hymen is a membrane that forms a barrier in the vagina, blocking the cervix. As the cria matures, the hymen breaks down. In some alpacas it may remain in place making successful breeding impossible. The veterinarian can correct this, but it is questionable whether



Drawing from Spurgeon's Color Atlas of Large Animal Anatomy



Pictured above: Normal vulva (left), abnormal presentation because the opening to the vagina is almost absent (middle), hermaphrodite which means having sexual parts of both sexes (right). In this case this alpaca has both testicles and a small vaginal opening. Instead of urinating like a male, it urinated like a female.

that female should be bred, because this is a heritable problem.

Vagina

The vagina is the passageway between the vulva and the cervix. This is sometimes referred to as the birth canal.

Cervix

The cervix is the lowest part and entrance to the uterus and has a small hole called the cervical os. When viewed using a speculum in the vagina, it is similar in appearance to a small donut or bagel with a hole (the cervical os) that opens into the uterus. The penis extends through this hole during breeding to deposit sperm in the uterus. Breeding too frequently can damage the cervix. This hole stretches wide during labor to allow the cria to pass through and deliver.

Uterus

Another word for the uterus is womb. During pregnancy this is where the cria grows and develops. The alpaca uterus is different from a human uterus because it is shaped like a stubby "Y" with two uterine horns. Almost all pregnancies (98 percent) take up residence in the left horn of the uterus. The uterus is lined with special tissue called the endometrium. This is the tissue that the fertilized egg implants into. Breeding actually does a certain amount of damage to the uterus, irritating the uterine wall. This is why it is best not to leave intact males in with females except for breeding.

Ovary

Like humans alpacas have two ovaries, one on the left and one on the right, and they serve the exact same purpose. The ovaries are where the follicles or gametes are stored, mature, and eventually are released. A follicle or gamete is another word for the egg before it has been fertilized. Like human females, a female alpaca possesses all the follicles she will ever have the day she is born. Only a few of them will mature to be released.

The ovaries are also responsible for producing hormones. Estrogen is the hormone that influences female characteristics, such as development of the uterus and of an udder. Progesterone is a hormone produced to maintain pregnancy.

Pictured above are two abnormal udders. Too many teats (left), some of which are probably without the tissue to produce milk. This can confuse the cria. Abnormally large teats (right) appear to share the same quadrant of the udder. The teat size may make nursing difficult for the cria and milk production may be reduced due to the size of the udder.

Oviduct

This is the tube leading from the ovary to the uterus. It is the passageway the follicle travels through once it is released from the ovary to travel to the uterus. It is also where fertilization of the egg takes place. Sperm that are deposited during breeding in the uterine horn swim up the oviduct and with luck, one penetrates the released follicle to create an ova or fertilized egg. For three days the ova continues its way down to the uterine horn to implant and begin the long process of growing into a cria that will be born 330–365 days later.

Udder or Mammary Glands

The alpaca udder has four segments and each of those have a nipple from which the cria suckles. Unless the female is pregnant or nursing a cria, the udder is not very large, but close to delivery and after the cria is born, the udder swells as the milk glands enlarge to produce milk. If a female is going to be used for breeding, it is important that your veterinarian assesses the udder to be certain it has only four teats and that they are normal in appearance.

Female Reproductive Physiology

Female camelids are different from other species in their reproductive physiology because they are induced ovulators. Other mammals have regular cycles where an egg (or eggs) are released every certain number of days. Alpacas and their cousins instead have waves of ripening follicles, but mating is required to stimulate the release of the egg from the follicle that holds it. This is referred to as induced ovulation. While other animals have a period of fertility where they are “in Heat”, alpacas are much more subtle about their periods of fertility.

Follicle Development

Each female is born with two ovaries that possess hundreds of follicles or gametes. Females reach sexual maturity between 10 and 24 months. The follicles in the ovaries remain very small until stimulated by hormones from the pituitary gland. With hormone stimulation, the ovaries experience what has come to be known as a follicular wave which is simply a term to describe the development and regression of follicles over the course of a few

weeks. The ovaries tend to experience these waves opposite one another so that typically, a female will have a "ripe" follicle.

Follicular Wave:

- Like humans, alpaca females are born with all the eggs they will ever have.
- When the alpaca becomes old enough, a few of these eggs start to mature in batches, first on one ovary, and then on the other.
- This cycle of maturing follicles is known as the **Follicular Wave.**
- While several follicles will mature, only one will mature to produce an egg for fertilization.
- The follicular cycle or wave, occurs on both ovaries, but the cycles on each ovary are usually offset so that they produce ripe follicles at different times.
- The entire cycle takes 12 days
  - First four days: Growth of several follicles in a batch.
  - Second 4 days: One of the follicles matures to become a Graffian follicle which will release and egg for fertilization if sex occurs.
  - Last 4 days of follicular wave: If sex does not occur, the follicle regresses.
- If the timing is correct (if there is a ripe follicle at the time of breeding) ovulation or release of the egg from the follicle will occur 24 to 48 hours after breeding.

Female Hormones of Reproduction

As with other mammals, there are numerous hormones that are involved in reproduction, and these are the same as what we possess.

Estrogen

- Produced by the follicles on the ovary.
- In humans, and most mammals, estrogen has peaks (first 14 days of our cycle) and valleys (last 14 days of our cycle) as long as we are not pregnant.
- In alpacas, the estrogen levels are relatively constant because of the overlapping follicular activity on both ovaries, unless the alpaca is bred and conceives.
- Estrogen is produced by the secondary follicles during the follicular wave.
- Estrogen production is suppressed in the presence of progesterone.

Gonadatropic Releasing Hormone (GnRH)

- This hormone is produced by a small part of the brain known as the hypothalamus, in response to the alpaca female having sex.
- It is thought that the combination of orgling, cervical penetration by the penis, and the male mounting the female all stimulate the release of this hormone.
- Within 15 minutes of breeding levels of GnRH are high enough to affect the pituitary, its target.
- Gonadatropic Releasing Hormone causes the pituitary gland to release leutenizing hormone.

Leutenizing Hormone

- This hormone is produced by the pituitary gland which sits right below the hypothalamus.
- It is responsible for stimulating the ripe follicle on the ovary to rupture and release the egg.
- It is also responsible for causing the

remaining follicle to become a corpus luteum.

- The level of LH rise to a peak at about two hours after breeding and fall to normal four or five hours later.

Progesterone

- This hormone is produced by the remaining follicle after ovulation has occurred.
- The same leutenizing hormone that stimulated the follicle to release the egg, then stimulates the follicle tissue to become a progesterone secreting body known as the Corpus Luteum.
- If pregnancy did not occur, the corpus luteum will simply fade away into the sunset and progesterone levels will drop.
- If pregnancy results, the corpus luteum remains and continues to secrete progesterone throughout the pregnancy.

The Follicular Wave in a Nutshell

→ Breeding

→ Nerves stimulated in brain

→ Hypothalamus in brain releases GnRH

→ Pituitary releases leutenizing hormone

→ Follicle releases Egg

→ Remaining follicle evolves into corpus luteum

→ Egg migrates down fallopian tube and is fertilized by a sperm

→ Egg implants in uterine wall and develops into cria

Breeding Physiology

- Unlike other livestock that have definite periods of being in heat, the alpaca has estrogen circulating continuously at some level due to follicular waves occurring on both ovaries.
- Because of this, the female is not as obvious regarding her periods of fertility.
- This requires the breeder to observe her behavior and breed at those times when she is most likely fertile, or at least respect the fact that she is not fertile all the time.
- Signs of receptivity may include:
  - Flirting, walking next to the fence or gate when males are on the opposite side and flipping tail upward and positioning herself so that the male can smell her posterior.
  - Cushing adjacent to other breeding alpacas.
  - Cushing whenever a male is near.
  - Trying to breed other females.
  - When the male and female are put together, the male will chase the female and attempt to mount her. He usually orgles, a special love song males make to encourage the females to cush and breed. If she is both psychologically and physiologically “open”, she will cush or lay down on her chest, with her legs underneath her, and allow the male to mount her.
  - Some maidens are not psychologically ready, even though they may be physiologically able to ovulate and conceive.
  - Some female alpacas may be psychologically ready, but not physiologically. They flirt, but do not have mature ovaries.

- To make things even more complicated, occasionally a female will act ready to mate any time or be pregnant, but still go down for breeding!
- Obviously, the best scenario is to breed when the follicle is ripe with an egg, which is in the middle of the 12 day follicular wave (days five to eight inclusive). If you observe your females for receptivity, you may have better luck helping her to conceive, by scheduling her breeding when you think she is "ripe."
- Breeding more than once in 24 or 48 hours will not increase the rate of conception.
- It is important not to force females to breed (The exception to this is the reluctant maiden who may be frightened or confused by the process and refuse to go down.), for overbreeding can lead to:
  - Cervical and uterine damage.
  - Increased susceptibility to infection of the reproductive tract.

- If ovulation occurs after breeding, the female will consider herself pregnant for 14 to 17 days, even if conception (fertilization) does not occur.
- This is because leutenizing hormone has caused ovulation, and the remaining corpus luteum is secreting progesterone.
- If progesterone is present, the female will think she is pregnant and refuse to breed.
- The presence of progesterone will keep the ovaries from moving through another follicular wave.
- If the egg implants in the uterus, a feedback mechanism will cause the corpus luteum to continue to produce progesterone until the pregnancy comes to an end.
- If the egg does not implant, the corpus luteum will regress after this 14 to 17-day period.
- Therefore, as long as a female refuses to breed after breeding within the past 14 to 17 days, you should not bother breeding her, for she doesn't have any ripe follicles for ovulation and fertilization.
- If breeding occurs and ovulation does not occur, the female will be psychologically and physiologically receptive in two to five days.
- Signs that the female is not receptive to breeding are the female running from the male and refusing to cush, kicking at the poor lovestruck guy, and/or pasting him with green slime.
- All these behaviors may mean:
  - she may be pregnant,
  - she may not have any ripe follicles,
  - she "thinks" she is pregnant, or
  - she has most likely ovulated.

Pregnancy and birthing will be covered in another chapter.

What You Should Know

- **Understand the basic reproductive anatomy of the male and female alpaca.**
- **Be able to recognize abnormalities of the male and female genitalia.**
- **Identify how hormones affect the ability for pregnancy to occur and be maintained.**

CHAPTER 11

Pregnancy, Birthing, & New Cria Care

⚠ Caution: This chapter contains graphic photos of an alpaca giving birth.

Introduction

Chapter 10 covered the reproductive anatomy of both males and females, as well as their physiology and hormones. This chapter is going to briefly cover pregnancy, birthing, and care of the newly arrived cria. If you have a dam (an adult female alpaca) or are considering raising and breeding alpacas, this information might be useful. Very little of this material is required for youth participating in 4-H or another club, but still might be of interest.

A dam in her last days of pregnancy

Pregnancy

The pregnancy of an alpaca lasts almost a full year! The gestation (pregnancy) ranges between **330 and 365** days or longer. Alpacas almost always have just one cria. Twins are very unusual.

A long gestation is advantageous to alpacas and their cousins, llamas, guanacos, and vicunas, because of the environment they naturally live in. The wet season in South America is the best time for crias to be born. The weather from December to March is most favorable for the growing grasses that provide the dam with enough food to feed herself and produce enough milk to help her cria grow.

Pregnancy determination is done in a number of ways, but not all of them are 100 percent accurate throughout the pregnancy.

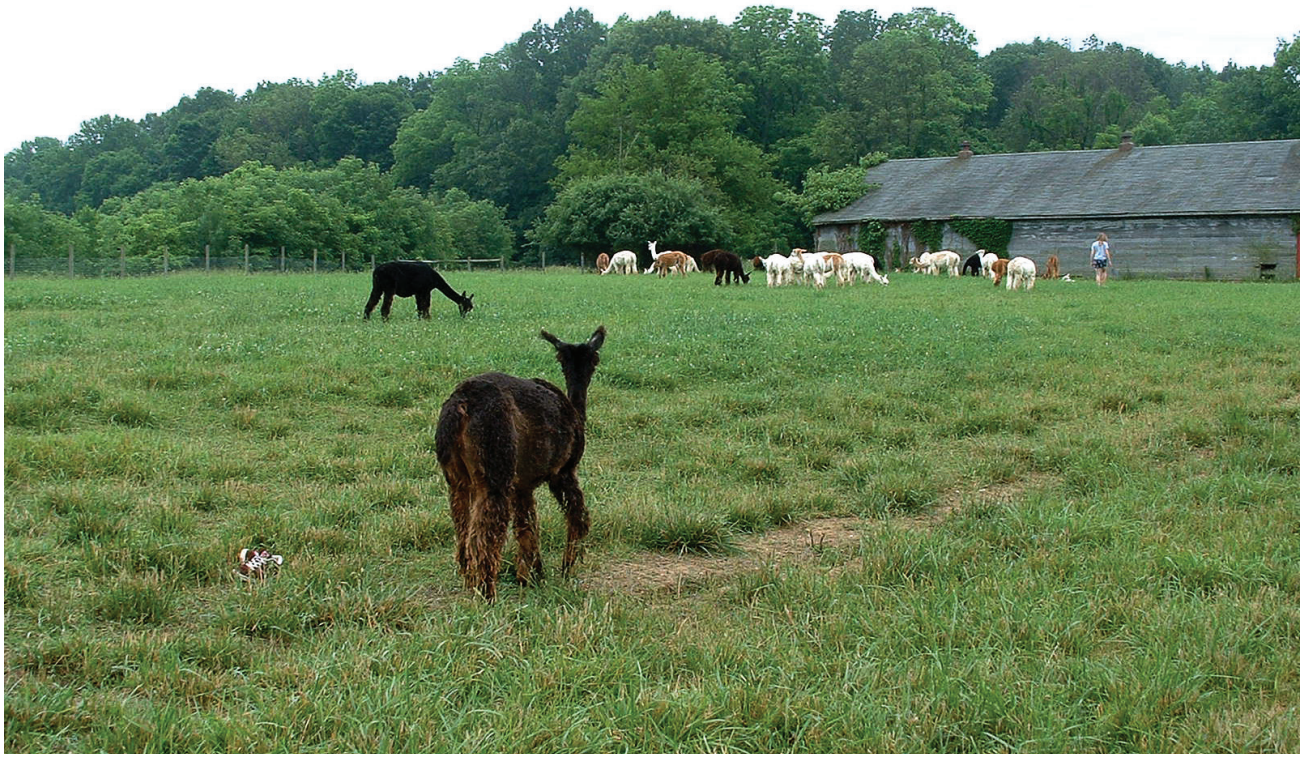
- **Spitting Off:** When a dam is pregnant, hormones signal that she should not be bred again. A week or two after breeding, and throughout the pregnancy, owners will bring a male into her area to check her reaction. If she believes she's pregnant, she'll try to avoid the male, and if he gets too close or follows her, she'll spit at him—hence the term "spitting off." Since females don't visibly appear pregnant until a couple of months before the cria is born, owners use this method throughout the pregnancy. However, since some females may act grumpy even when not pregnant, this test isn't entirely accurate.
- **Progesterone:** The body secretes this hormone to maintain pregnancy. Blood is drawn to check progesterone levels. Occasionally, something called a retained corpus luteum, or CL can secrete progesterone and give a false positive, so this test is not 100 percent accurate.
- **Ultrasound:** This is the most accurate method of confirming pregnancy in

the first few months of pregnancy. In early pregnancy the ultrasound probe is inserted into the rectum. In later pregnancy, the fetus (developing cria) sits far forward and higher in the abdomen, so ultrasounds are less reliable. A transabdominal ultrasound is used after the first two or three months.

- **Ballottement:** This technique requires some expertise and experience. It's performed later in pregnancy, around the tenth or eleventh month if needed. A quick, firm push with a fisted hand against the dam's abdomen sends the cria away; then, the cria bounces back and lightly bumps against the fist.
- **Fetal movement:** One of the most fun things to watch is a fetus moving around in its dam's tummy. If it's spring and the dam has recently been shorn, you can sometimes see a foot or knee poking and moving along her side. Another spot where you might see movement is under her tail, where the area around the rectum and vulva (entrance to the birth canal) can bulge as the fetus pushes out.
- **Udder development:** The development of an udder is a good indicator of pregnancy in the last months of gestation, but does not always happen until just before or even after birth.

Labor

This refers to the period when the uterus or womb the baby is enclosed in starts contracting to push the cria out through the birth canal. Alpacas are interesting because they tend to give birth in the morning while many other livestock species give birth at all hours. A birth later in



The dam in labor may get left behind by the herd as she works to push the cria out.

the day should raise concerns. Protracted labor demands the intervention of a veterinarian or someone with experience delivering alpacas.

- **Signs of Labor:** Alpacas are very stoic and do not show they are having problems or in labor because they do not want to appear vulnerable to predators. **Restlessness** is the first sign. The dam may get up and then cush or even lie on her side several times. Unless you are watching closely, you might miss this. **Frequent visits to the poop pile** is the next sign. The last sign is **actual intense straining** and two pairs of toes and a nose hopefully appear. If the alpaca has a larger pasture, the dam in labor may get left behind by the herd as she works to push the cria out.
- **The Three Stages of Labor:**
  - **Stage 1** is the labor to get the cria moving from the womb into the birth canal—opening the canal enough for the cria to get to the outside.
  - **Stage 2** is when you have the cria moving out of the dam and onto the ground.
  - **Stage 3** is the delivery of the special bag the cria has been growing in called the placenta. This usually happens within an hour of the cria being born.

Delivery

A fancy word for birth is parturition and the best births from a breeder's perspective are when you go to the pasture to check to see if the dam is showing signs of labor and a new cria is standing next to mom nursing.

If a dam has been in obvious labor for more than one hour with no obvious progress, it is recommended that the female be examined to be certain the cria isn't "stuck" because of an improper positioning of the cria in the birth canal.

Things are progressing! A nose appears!

Dams have different birthing techniques. Some stand the entire time, some lay down for most of their labor, and others do a combination of both. The normal birth progresses to the appearance of a nose and two sets of toes, but not necessarily at the same time. Often you will see the nose first. Resist the temptation to assist unless your experience tells you something is wrong. Some suggest getting a chair, a lead rope, and tying yourself to the chair. Resist the temptation to pull on an alpaca that is hanging out of its dam. It is normal to have pauses in labor and pulling could harm the dam or cria. Also allowing the cria to hang out of the womb allows fluids to drain from the cria's airways. If the cria is out this far it will be only moments before the last push expels the cria. Patience!

When the cria is born you will see that it is wrapped in a special membrane called the epidermal membrane which is thin and clear. This is unique to the camelid family and may help make the cria more slippery to ease passage through the birth canal, but nobody really knows why it exists.

The third stage of delivery is the passing of the placenta. The placenta is inside out and when

it is being expelled it looks like a big purplish ball hanging from the dam's posterior. It is important to examine the placenta to be sure it is intact. If it is torn, it may indicate that pieces are still left in the womb.

The Newborn Cria

Few things are as exciting as the arrival of new life. However, it's important to do a quick check to ensure the newborn is healthy. Then, step back and let the dam and cria bond while you observe from a distance to make sure the cria nurses successfully.

What to do:

- Be certain the cria is breathing easily through both nostrils.
- Be certain the umbilical cord is not bleeding and dip it in Chlorhexidine solution (Nolvasan).
- Check the dam's udder and remove the wax plugs from the teets. Squeeze to express a drop of colostrum.
- Check the sex of the cria (two holes—girl, one hole—boy).
- Check to see if the incisors have erupted which indicates the cria is not premature.
- Weigh the cria so that you can be sure the cria is gaining weight over the next several days/weeks. The newborn cria should weigh 8 to 25 pounds (3.8 to 11.3 kg).
- Check the cria's temperature rectally, especially if it was born in cool or wet weather. Crias can sometimes struggle with thermoregulation, but after one hour, its temperature should fall within the range of 99–101°F (37.2–38.3°C).

If the weather is rainy, snowy, or cold, make sure the cria stays warm. Start by drying it off

and placing it on a clean towel. You can use an electric dryer to warm the cria while drying it. Many alpaca owners use cria coats to keep them warm, but if you don't have one, you can substitute a dog coat or even a child's sweatshirt for extra warmth. If you're concerned about the cria getting cold, check its temperature rectally to ensure it's not too low, as this can interfere with nursing and proper digestion of colostrum and milk.

Now it is time to move off to observe the two and watch the cria try to take its first steps and nurse. It is difficult because we want to help, but it is best to let the two of them work things out and bond.

Unless the weather is inclement, it is best to leave them in the pasture. The cria's instinct is to seek the udder in the shadows under it mother's belly. A barn creates more shadows that can confuse the cria and interfere with it finding the udder.

Over the first few days of life, it is important to track the weight of crias daily to be certain they are gaining weight. It is normal for a cria to lose a half pound or so the first day after birth, but after that, it should gain about 1/2 pound per day.

Crias, like humans, pass their first poop called meconium in the first 48 hours. Often it goes unseen, but if your cria is straining, is acting

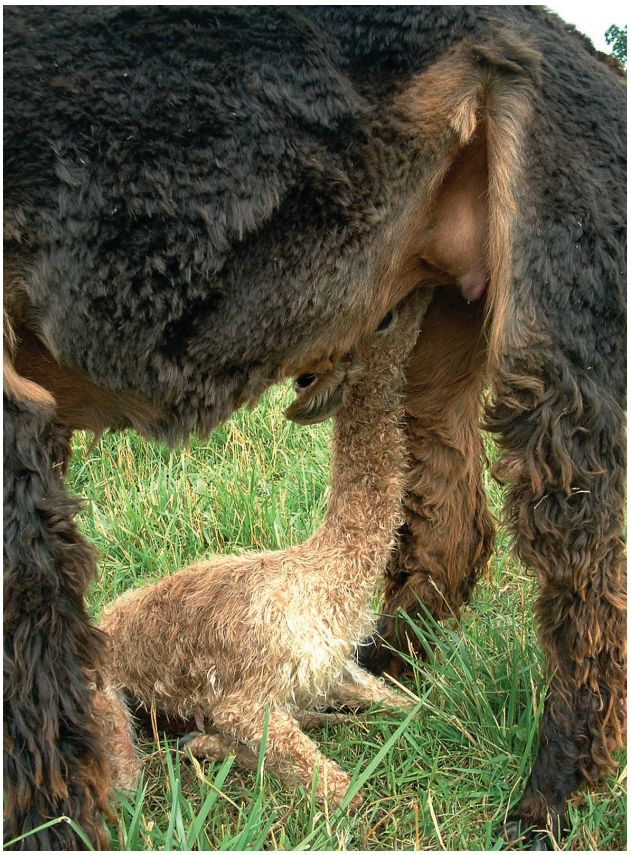
Stage 3 of labor: Delivering the placenta (left). Normal, intact placenta (right).

"off" or has lost its appetite, it may need a bit of assistance and part of an adult enema can be administered. Consult your veterinarian should these symptoms arise.

Cria Immunity

New World Camelids—alpacas, llamas, vicunas, and guanacos—are different from other mammals who are able to get some antibodies while in their mother's womb because the antibodies can cross th placenta. The alpaca cria's placenta does not allow antibodies to cross, so the cria must rely completely on the first milk known as colostrum to supply the antibodies it needs.

If the cria does not nurse from its dam within the first 24 hours, it is likely to become immunocompromised and highly susceptible to infections. Your veterinarian can perform a special blood test to check the cria's antibody levels. If the levels are low, the veterinarian can administer a plasma transfer to boost its immunity.



Success! A bit lazy, but the cria has found the "tap" or "milk bar."

Conclusion

Few experiences bring as much joy as the birth of a new life, whether human or animal. The entire process, from conception to birth, is truly amazing. While complications can arise, this chapter will not focus on those details, as they require a veterinarian's care. Rest assured, most of the time, a dam's pregnancy, labor, and delivery proceed without complications, and the cria thrives.

Medical Items to Have On Hand (from Dr. Pamela Walker)

- Nolvasan or Betadine antiseptic liquid to dip the cria's navel.
- A nasal aspirator like those used for human infants.
- A glucometer to check glucose levels. The human type is just fine. Purchase one that already has some strips included and does not need to be calibrated.
- Thermometer
- Stethoscope
- 50 percent Dextrose (date and keep in fridge once opened). Any farm supply store will have a 500 mL bottle labeled for cows.
- Pedialyte or a similar generic oral electrolyte (you can use a powder mix also).
- Enemas—pre-bottled adult Fleet enemas (the saline type) work more quickly and thoroughly than mineral oil pediatric enema types.
- Dental floss to tie off umbilicus if bleeding. Use the fatter floss so that you don't accidentally cut the cord with the floss. It is better to NOT tie off the cord if possible.
- Pritchard Nipple (new and slightly used but clean). Do not forget to cut off tip if new. Also, a double threaded pop or water bottle or off set bottle.
- Bottle brush to clean bottles—crias are very fussy about bottle hygiene.
- Red rubber feeding tube or similar and new 60 mL catheter tip syringes (two) for tube feeding.
- Cria coat in various small sizes and thickness.
- Powdered colostrumReplacer—preferably for goats and not the all-species type.
- Meyenberg Evaporated Goat Milk with Vitamin D (can get the pasteurized type later if needed).
- Paper tape if need to tape flipped ears (does not stick to the fiber).
- Vitamin A & D injectable or paste. Injectable every two months, oral paste every two weeks. Check with your veterinarian for dosing or see Chapter 19, *The Camelid Medicine Cabinet*, for doses and more information.

CHAPTER 12

Parasites

Introduction

Parasites are organisms that live on or in a host organism, so alpacas can have two types of parasites, external and internal. We will talk about both kinds because they can both be harmful.

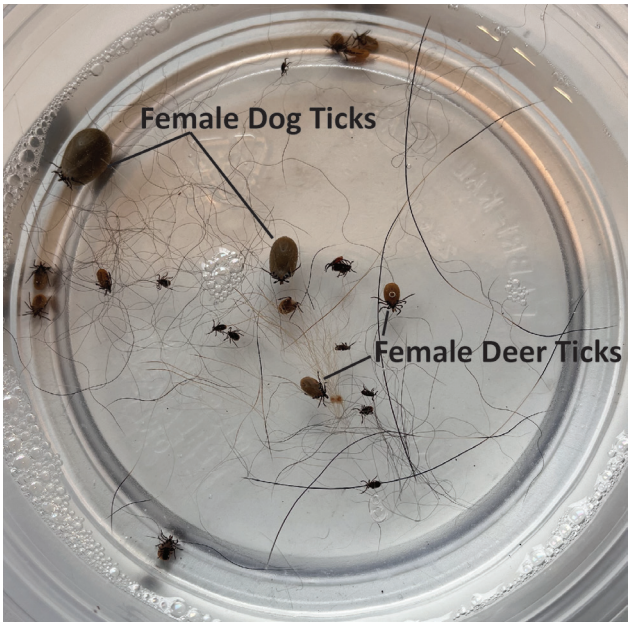
External Parasites

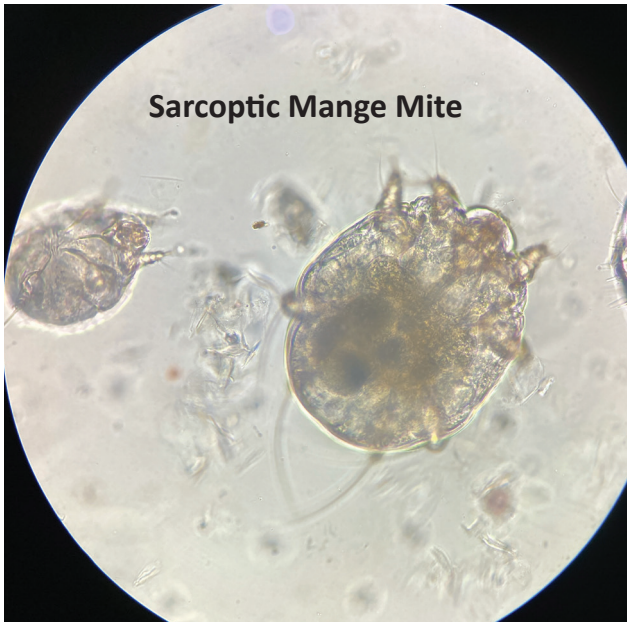
External parasites, or ectoparasites, live outside the alpaca. Mosquitoes and biting flies are examples of external parasites, but there are some others that we should also be aware of.

Ticks: The same ticks that can bother you or your dog and cat, can bother alpacas. Deer, dog, and lonestar ticks can climb onto your alpaca and suck their blood. Unfortunately, the saliva of ticks can cause an unusual reaction in some animals called "tick paralysis." The alpaca, slowly over a few hours or a few days, becomes paralyzed when a tick feeds on it. The only treatment is removal of the tick which can be difficult to find in an animal covered in fleece. Ticks also carry other diseases such as Lyme Disease, so if they are seen, they should be removed immediately using tweezers and pluck the tick from as close to the skin as possible so you get the tick's head out too.

Spinose Ear Ticks: These are soft bodied ticks that infest the ears of alpacas. They are most common in the southwest U.S., but do occur in other parts of the country. An alpaca with these ticks will try to rub its ears and shake its head frequently because of the irritation the ticks cause. It may even walk with its head tilted oddly. Because the ticks can infest deep into the ear canal, they can be difficult to see. Your veterinarian should be consulted if you suspect your alpaca has spinose ear ticks.

Lice: Fortunately, lice are not very common in





alpacas. There are sucking lice and biting lice. Scratching is the primary symptom. Lice may be difficult to find and identify in the thick fleece of an alpaca. You might not even know your alpaca has lice until you discover their eggs or nits attached to individual fibers in the alpaca's fleece. Contact your veterinarian for treatment.

Mites: There are three types of these ectoparasites that can affect alpacas, and it is difficult to distinguish between two of them. Thickened and scaly skin particularly on and between the toes is the hallmark of mites. When this is seen, you should call the veterinarian, who may choose to do a skin scraping to identify the mite using a microscope. Treatment will depend on which type of mite is found.

- **Sarcoptic Mange Mites:** These mites cause severe itching, pimples, crusting of the skin, and thickening of the skin. This can occur on and between the toes, on the belly, in the arm pits, on the ears, and on the muzzle.
- **Chorioptic Mange Mites:** The symptoms for this mite are similar to the symptoms for sarcoptic mange, but it usually is less itchy.
- **Psoroptic Mange Mites:** This mite is much less common in alpacas than the other mites and primarily affects the ears, although they can spread elsewhere.

Internal Parasites

These are organisms that live inside your alpaca, usually in the digestive system. It is hard for us to imagine that it is normal for our alpacas to have organisms living inside them, and we would like our alpacas not to have any parasites at all, but actually, that is not normal.

You and I have organisms called bacteria and fungi growing on our skin and in our digestive system. This is normal too and these organisms are called "normal flora." Sometimes there is an unusual organism that can make our animals sick, or the normal balance of bacteria, fungi, or parasites can get upset, and then the alpaca can act sick.

Usually the alpaca's immune system will allow it to keep parasites in check by expelling them before they can do damage, but there are certain times that alpacas are more likely to be affected by parasites:

- When they are under stress, such as going to shows or being transported to a new farm
- When they have given birth
- When they have been moved in with different alpacas or moved into a different pasture
- When they have been sick from some other illness
- When they have been injured or had surgery
- When they are being weaned (the cria is separated from their mother to stop nursing)

By observing your alpaca daily, you might notice changes that are signs that your alpaca may have a parasite problem. Here are some things that you can look for:

- The alpaca is moving slower and not keeping up with the herd.
- Weight loss, which can be confirmed by doing the body scoring as described in Chapter 6 on husbandry.
- Diarrhea or clumpy stools.
- Blood and mucous in the feces (poop).
- Enlarged abdomen or belly. Alpacas that are heavily infested with parasites can

have a distended abdomen that is bigger than it should be compared to their body score.

- Bottle jaw—when soft swelling occurs under both sides of the jaw—can occur if an alpaca has a heavy worm infestation that causes a drop in blood cells and protein in the blood. Low protein cause fluid to leave the blood stream and accumulate in the tissues including under the jaw.
- Pale gums. If you check the teeth and gums of your alpacas once a month (or more), you will train your eye to what the normal color of the gums are. If the parasite load is too high, your alpaca can become anemic or have reduced red blood cells—a low red blood cell count or low RBC. This will make the gums paler than when the alpaca is completely healthy. Alpacas with dark pigmented gums make it more difficult to tell if they are pale.
- Pale inner eye lids. By examining the inner eyelid of your alpacas monthly (or more), you can train your eye to what the normal color of the inner eye lids should be. A special method called the FAMACHA system was developed in South Africa to help determine if goats or sheep are anemic by looking at the inside of their lower eyelids and comparing them to a card with photos of the inner eyelids of goats and sheep that are experiencing different levels of blood loss (anemia). There is a special online training system to learn how to do this that is presented by the University of Rhode Island. Unfortunately, you cannot get a FAMACHA card without completing this course.

If you think your alpaca may have a parasite problem, the next step is to determine what parasites an alpaca has by performing a fecal test, or "fecal" for short. Usually a veterinarian does this, but some alpaca owners have trained to do them as well. Either you or the veterinarian obtains a sample of the alpaca's feces (poop). A small portion is weighed and then mixed with a special solution.

After waiting for a certain amount of time, a drop or two of that liquid sample is put on a slide and examined under the microscope. The examiner can see and identify the different types of parasite eggs and organisms that are present. The number of eggs for each type of parasite that are found helps to determine if the alpaca is struggling with one or more parasites. Internal parasites are diagnosed by looking for the eggs, not the worms themselves, although sometimes you might see a worm in the poop pile. Even so, you can't be sure who shed the worm so a fecal test is the best practice. A list of some of the **internal or endoparasites** that are common to alpacas follows.

Gastrointestinal Parasites

These parasites live in the digestive system of the alpaca.

This alpaca has a very pale inner eyelid that is noticeable even though this is a dark pigmented animal

Protozoa: This group of parasites are single celled organisms. They can only be seen using a microscope. But don't let their small size fool you! They can cause lots of problems! All protozoa are more likely to infect your alpaca when the weather and pastures are damp.

Coccidia: There are hundreds of types of coccidia, but only four different species or types affect alpacas. It is normal to see a few of these three species in a fecal, but they can cause diarrhea, especially in crias if they become too numerous. The fourth type, Eimeria macusaniensis (E. mac), is the most serious type of coccidia. It is much larger compared to the others and can escape detection in a fecal. E mac can cause permanent damage to the intestines. When it is found, it is recommended that you treat the alpaca. Owners usually do not treat for the other types of coccidia unless there are many coccidia found in the fecal test, or the animal is acting sick with diarrhea. Your veterinarian will help you decide if your alpaca needs to be treated and what to use.

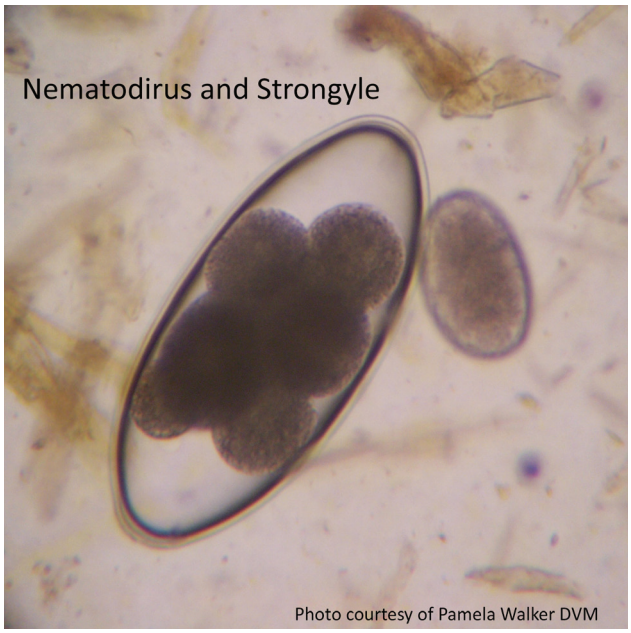
Cryptosporidium and Giardia: Fortunately, these organisms aren't seen as often as coccidia. They both also cause diarrhea and can be very difficult for crias to deal with. Both organisms are more likely to infect alpacas when the environment is wet. There is no medicine to treat Cryptosporidium, but your veterinarian can prescribe medicine to treat Giardia. Both of these organisms can make people sick too, so where gloves if you are dealing with poop from an alpaca with diarrhea.

Nematodes (Round Worms): This large group of parasites are visible to the naked eye, but we rarely see the actual worm. The fecal test uses the microscope to see the eggs that pass through the intestines. There are many different types of nematodes that affect alpacas. Different species live in different parts of the gastrointestinal tract.

Strongyles: There are many different strongyles that affect alpacas including Osterstagia, Cooperia, Trichostrongylus, but the most serious of these is a parasite called ***Haemonchus contortus or barberpole worm***. This nasty parasite is a terrible blood sucker that affects sheep and goats as well. The blood loss from this parasite can and does kill alpacas, and can

Eimeria macusaniensis with another coccidia
Note the difference in size between these 2 species

Photo courtesy of Pamela Walker DVM



Nematodirus and Strongyle

Photo courtesy of Pamela Walker DVM

ANTHELMINTIC (MEDICATION)	DOSAGE CONCENTRATION	ROUTE OF ADMINISTRATION	COMMENTS PRECAUTIONS
IVOMEC (Ivermectin)	1.5 mL/100 lbs	SQ subcutaneous shot	Not effective on Whipworms or Tapeworms
DECTOMAX (Doramectin)	2.0 mL/100 lbs	SQ subcutaneous shot	Not effective on Whipworms or Tapeworms
PANACUR/ SAFEGUARD (Fenbendazole)	When using liquid or paste that has 100mg/ml 9.0 mL/100 lbs (9mg/lb) High dose: 23 mg/lb, 23 mL/100 lbs	Oral	Very safe in all ages and pregnancy. High dose, safe in all ages.
SYNANTHIC 22.5% Suspension (Oxfendazole)	4.0 mL/100 lbs (8.8 mg/ lb, 225 mg/mL)	Oral	Same class of drug as Panacur. Metabolized to Fenbendazole.
STRONGID PASTE (Pyrantel – pamoate)	4.5 mL paste/100 lbs (8 mg/lb, 180 mg pyrantel base/mL)	Oral	Not to be used with Levamisole. Moderate margin of safety.
VALBAZEN (Albendazole)	5.0 mL/100 lbs (5.5 mg/ lb, 114 mg/mL)	Oral	Do not use if pregnant or less than 50 lbs. Can cause liver failure in young crias or if given for multiple days. Can repeat once in 7 days with severe infection
PROHIBIT (Levamisole)	Sheep concentrated drench: 52 gram packet is dissolved in 17.5 ounces of water. Then 2 mL/50 lb. is given	Oral	Oral route is safer than SQ. ONLY to be used if no other drugs work! Not good on Whipworms or Lung worms. May cause coughing after adminstration
CYDECTIN Sheep Drench 1 mg/mL (Moxidectin)	10 mL/110 lbs (0.09 mg/ lb, 1 mg/mL) Use dose chart on container.	Oral	Use in alpacas older than 4 months. Moderate margin of safety. May cause coughing after administration.
QUEST® gel (Moxidectin) Horse 2% paste 20 mg/mL concentration	2.7 mL/300 lbs, Once (0.18 mg/lb dosage) Very concentrated to use in alpacas or small/young llamas.	Oral	Best used in the provided syringe only in adult llamas. Ideally put in different syringe to deliver dose.

Chart courtesy of Pamela Walker, DVM

do so in a short amount of time. All strongyles can cause blood loss or anemia and weight loss, but barberpole worm is the most threatening and demands immediate treatment directed by your veterinarian. Resistance to anti-parasite medications has made barber pole worm an even bigger threat.

- **Whipworms:** These threadlike worms also cause diarrhea, blood loss, and poor weight gain and growth. Whipworms are also developing resistance to drugs.
- **Nemotodirus:** This roundworm has eggs that are much larger than the strongyle or whipworm eggs, so it makes them easier to identify. They cause weight loss, diarrhea, and poor growth in younger alpacas.
- **Parelaphostrongylus tenuis or Meningeal Worm (M worm):** This roundworm is only a problem in those parts of North America that are east of the Mississippi river. The worms are carried by white tailed deer that are not harmed by the worm. Unlike the other strongyles, it doesn't cause problems in the gastrointestinal tract. It does its damage after it migrates from the alpaca's digestive system to the spinal cord and brain. Here it chews away at the nerves and causes paralysis. The focus of alpaca owners is to prevent the worm from living long enough in the alpaca to do such damage. Shots of an avermectin type of medicine (ivermectin or doramectin) are given monthly. If you live in eastern North America, you should discuss the meningeal worm and its prevention with your veterinarian.

Cestodes (Tapeworms): This class of worms live in the alpaca's intestines. They are a flat and segmented worm that fortunately doesn't do much harm to the animal. Occasionally, segments from the worm are passed in the feces of the alpacas and are visible in the poop pile. If you spot these segments or the fecal test shows tapeworm eggs on the slide, you should discuss treatment with your veterinarian.

Trematode (Liver Flukes): Fasciola hepatica is the scientific name for this parasite that can be found all around the world and affects alpacas, other livestock, and humans. After eating egg like cysts on grass in wet areas, the cysts hatch in the small intestine and the larvae migrate to the liver. After eating away on the liver tissue, the adult worm moves to the bile ducts and lay eggs. The adult flat worm is a little larger than ½ inch long. The lifecycle of the liver fluke must utilize water snails as intermediate hosts. It must have standing water, so eliminating standing water in areas where alpacas graze can be a good control. If you live in an area where liver flukes are a problem, you should discuss prevention and treatment with your veterinarian.

Blood Parasites: Fortunately, there is only one blood parasite that affects alpacas.

Mycoplasma haemolama: Once known as "Epi", this organism is a parasite of red blood cells. It is found by doing a blood test. Some researchers feel that close to 80 percent of alpacas have these bacteria, but only a few of them become sick with it. If the alpaca is unable to fight the infection it can become anemic (have fewer red blood cells which are important for carrying oxygen). Times of stress or other illnesses can lower an alpaca's ability to fight this organism. It is thought that alpacas get the infection from insects that bite an infected alpaca and then bite another alpaca, and pass on the organism. After a positive test, your veterinarian can prescribe an antibiotic to treat the alpaca.

Parasite Life Cycle

- Some parasites complete their entire life cycle using only one host. Roundworms are an example of this. The alpaca accidentally eats a worm larva that is on the pasture grass. The larva is passed into the intestine and attaches itself to the lining of the intestine, sucks blood, and matures into an adult.
- The adult larvae feeds on the blood of the alpaca and lays eggs. These eggs pass out of the alpaca onto the pasture and hatch if the weather conditions are right (warm and moist). The larva that hatches feeds on the dung until it reaches its infective stage and moves onto the grass to be accidentally eaten by the alpaca, thus completing the lifecycle.
- Other parasites have an intermediate host. In the case of meningeal worm and liver flukes, a snail or slug serves as the intermediate host, and without this intermediate host the life cycle of the worm cannot be completed.

Methods to Prevent and Control Parasites

As we said earlier, it is normal for alpacas to have some parasites. It is not possible to eliminate them all, but there are things we can do to help prevent alpacas from being adversely affected by them.

- Most important is to keep your alpaca healthy and as stress free as possible. Stress and illness lower an alpaca's immunity and makes them more susceptible to parasites bothering them.
- Provide good quality hay, pasture, and supplements to keep your alpacas' immune systems in top form.
- Keep the feces (poop) cleaned up. Regularly scooping alpaca poop will help keep the pasture from being contaminated with eggs that are shed in the alpaca feces.
- Alpacas share parasites with goats and sheep, so keep this in mind if you decide to keep other livestock with your alpacas. Sheep and goats poop wherever they happen to be, which makes cleaning up after them impossible.
- Feed hay in containers off the ground.
- Provide adequate pasture and hay so that alpacas are not forced to eat close to poop piles.

Nematode shed in feces

- Control moisture around pasture and barns so that there is good drainage and no standing water.
- Clean water troughs regularly. Alpaca like to stick their legs in water troughs to cool themselves off. This can contaminate their water with coccidia and other bacteria.
- Use quarantine areas for alpacas that are new to the farm or that have been to shows. Because of the stress of traveling, these alpacas are more likely to shed more parasite eggs.
- Fecal testing of alpacas you think might be affected is a good way to help prevent and eliminate problems, for heavily infested alpacas will shed more worm eggs than those with just a few parasites.

Medications to Treat Parasites

Tapeworm

The chart on the previous page shows many different types of medications that can be used to treat parasites. It is important to first determine that your alpaca has a parasite problem **and** which parasite is responsible, because certain parasites will only respond to certain medications. It is important to consult with your veterinarian about which medication to use and how often to use it.

There are only two ways to get medicine into an alpaca, by mouth or by shot. Alpacas don't take pills, so we must give them liquids with the medicine mixed in. Whether a shot or a liquid by moth, we often need to calculate how much liquid to use to give the alpaca the correct dose.

In the past, livestock owners have given anti-parasite medicines too frequently, and that has caused some parasites to become resistant to almost all treatments. Now, livestock owners are advised to only treat the animals that are showing signs of infection, and to leave the unaffected alpacas untreated. This will help to slow parasites developing resistance to the medicines we have available to use.

Calculating Dosages

Alpacas come in many different sizes, and just like you, they need a different strength or amount of medicine than an adult does.

The easiest and safest method to determine the proper dosage is to ask your veterinarian how much medicine to give, and you should never hesitate to do this. Sometimes alpacas require a different dosage than other livestock and those dosages are not provided on the medication container. The mathematics to calculate how much of a medication you give your alpacas is complex. While we describe how to do this below, it is always best to have your veterinarian tell you how much to give. If you are unable to reach your veterinarian, perhaps an experienced

alpaca owner can help. There are also several publications written by Veterinarians that will provide this information. Those are listed in our Resource Section.

Veterinarian Dr. Pamela Walker has permitted us to include her document on medications in this handbook. We have it here in ***Chapter 16 The Camelid Medicine Cabinet*** by Pamela Walker, DVM.

Step 1 Determine Your Alpaca's Weight: The first thing you must do is determine the weight of the alpaca. If you are treating a smaller cria, you can pick it up and step on your home scale, but if you are treating an adult, you won't be able to do that and you must estimate the weight. There are specially marked measuring tapes that you can purchase to estimate an alpaca's weight, otherwise, unless you have a scale, you will have to make an educated guess. An adult alpaca weighs between 100 and 200 pounds. Males are larger than females and a female will weigh more when she is in the last months of pregnancy.

To complicate matters, some medications provide dosing information that refers to kilograms rather than pounds (lb). So you may have to convert your alpaca's weight from pounds to kilograms (kg). 1 pound = 0.454 kilogram

So if your alpaca weighs 125 pounds, you simply multiply that by .454 and you will have the alpaca's weight in kilograms.

125 lb. X .454 = 56.75 kg and It is safe to round that up to 57 kg. So your 125 lb. alpaca weighs 57 kg.

Step 2 Determine the Medicine Concentration: This information is included on the vial or bottle. The medication container will state that this product has a specific amount or concentration of medicine per milliliter (ml) or cubic centimeter (cc) of product. Cubic centimeter and milliliter are the exact same unit of measure. One cc of water is the exact same thing as one ml of water.

The medicine concentration is usually referred to in this way:

mg/ml which means milligram per milliliter OR

mg/cc which means milligram per cubic centimeter

Step 3 Determine the Dosage Alpacas Are Supposed To Receive: Usually alpacas get the same dosage as goats, sheep, and cows, but not always. This dosage rate might be provided on the medication bottle. The container may say the dosage for sheep, goats, and cattle, but alpacas won't be mentioned. Hopefully your veterinarian will tell you exactly what dosage to use.

Below are examples of how a dosage is written:

ml/kg which means milliliter per kilogram of alpaca weight.

mg/kg which means milligram per kilogram of alpaca weight.

mg/lb which means milligram per pound of alpaca weight.

ml/lb which means milliliter per pound of alpaca weight.

Step 4 Calculate How Much to Give Your Alpaca

Let's use SafeGuard (fenbendazole) Liquid Suspension as an example. The medicine is not dissolved, but is floating in the liquid, so you must be sure to shake it very well. The recommended dosage is 10 mg per pound of alpaca.

A 125 pound alpaca then needs 125 lb X 10 mg = 1250 mg of SafeGuard (fenbendazole).

The concentration of SafeGuard Liquid Suspension is 100 mg/ml. If there are 100 mg of fenbendazole in each ml (100mg/ml) of SafeGuard then 1250 mg ÷ 100mg/ml = 12.5 ml.

So you need to give your alpaca 12.5 ml. That may sound like a lot, but one teaspoon is 5 ml, so that really isn't very much at all!

Essentially, determining the correct dosage of medicine is an algebraic equation. The goal is to figure out how many milliliters (mL) of medicine to administer. Therefore we want to have ml on top of the equation when we are done.

To accomplish this, the concentration of mg per milliliter is flipped from 100mg/ml to 1ml/100mg. The formula for calculating dosages looks like this:

Alpaca Weight X Dosage X Medication Concentration
$125 \text{ lb.} \times \frac{10 \text{ mg.}}{\text{pound}} \times \frac{1 \text{ ml.}}{100 \text{ mg}} =$ 12.5 ml of Safeguard 100mg/ml Suspension

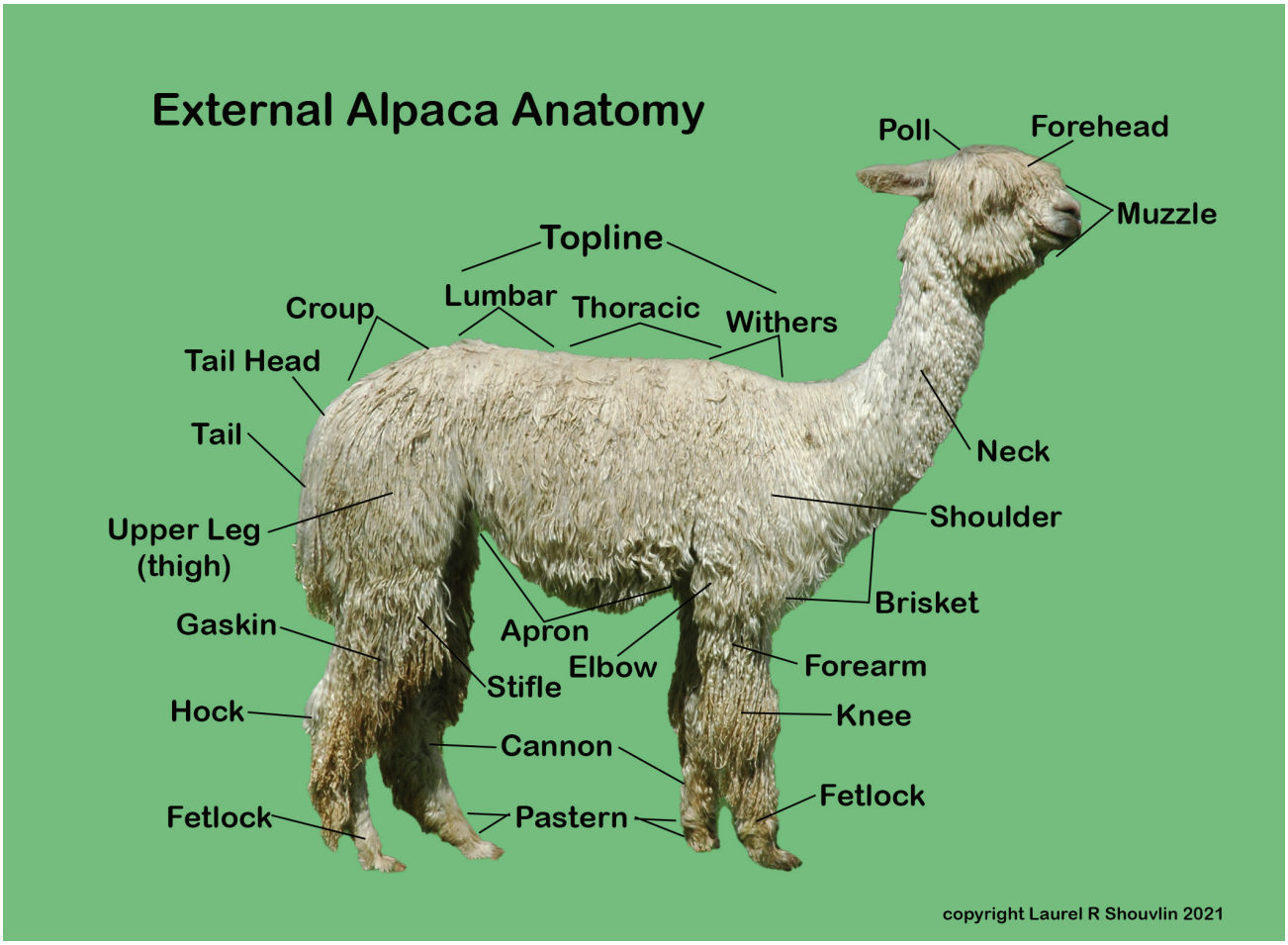
It is important to note that some medications come in different concentrations, so you must be careful to be certain you are using the correct concentration to calculate how much to give your alpaca . Vitamin D is an example of this, and people have harmed their animals by giving them too much vitamin D because they assumed what they were giving was a lower concentration.

What You Should Know

- There are two types of parasites: external and internal.
- It is normal for alpacas to have parasites and we should only treat an alpaca if it is having problems dealing with them.
- Be familiar with the conditions that might make an alpaca more susceptible to being affected by alpacas.
- Be familiar with the signs that could mean your alpaca is having parasite-related problems.
- Microscopic organisms called mites cause skin issues in alpacas.
- Parasites in the alpaca digestive tract are identified through a laboratory test called a fecal where the parasite eggs are identified and counted.
- There is no medication that can treat every worm, so it is important to identify the parasite and work with your veterinarian to determine what medication to use and what dose to provide.
- Familiarize yourself with the different medications used to treat an alpaca for a parasite problem.
- Review how to calculate medication dosages for alpacas.

CHAPTER 13

Alpaca Conformation



Introduction

Conformation refers to how an alpaca has been put together. Is its back or topline straight, humped, or does it sag in the middle? Are the legs straight in front or do they come in at the knees? Do its lower incisor teeth align properly with the gum above? Are its ears spear shaped or are they shaped like a llama's curved ears? Each of these questions relate to the conformation of an alpaca.

Conformational faults can lead to problems later in life. A narrow pelvis can cause difficulty for a female giving birth. Dropped pasterns can be painful and cause an alpaca to avoid moving around the pasture to graze. Improper jaw alignment can make it difficult for an alpaca to bite off grass in the pasture. During a halter show, judges assess conformation of an alpaca.

In Chapter 8 Alpaca Anatomy, we learned about the bones of the skeleton. Because we can't see the alpaca bones and muscles, we refer to limbs, joints, and regions when we talk about conformation. Below is a diagram of the parts of the alpaca that we refer to when we talk about

conformation.

Why do we worry about conformation?

- **Longevity:** Alpacas are typically kept for their entire natural lifespan. Poor conformation can lead to discomfort as they age, potentially affecting their mobility and overall well-being.
- **Comfort:** Issues such as soft pasterns or knock knees may affect the comfort of an alpaca as it moves around the pasture.
- **Birthing ease:** Having adequate space in the abdomen and pelvis affect how comfortable an alpaca dam will be during pregnancy and delivery.
- **Capacity for eating and breathing.**
- **Breeding ease:** A male or female who is poorly or weakly conformed in the rear might find breeding more difficult.
- **Appropriate hardware (vulva, testicles)** for successful breeding and conception is part of the conformation evaluation.
- **Correct proportion for fleece production.**
- **Correct bite for eating well.**
- **Conformation is inherited from the dam and sire.** We want to be able to Identify potential issues.

Heritability

This term refers to the likelihood of a trait being passed down from a dam or sire to its cria- what is the chance that the cria will have its dad's great fleece, or its mom's bad bite? Heritablities are determined by the genes of the mother and father and are referred to in percentages.

HERITABILITIES
Calculated for Sheep

Face Covering 56%
Staple Length 47%
Yearling Weight 40%
Fleece Weight 38%
Birth Weight 30%
Weaning Weight 30%
Conformation at Weaning 10%

Interestingly, the likelihood being able to change things from one generation to the next is not the same for all traits. For instance it is easier to improve fleece traits from one generation to the next than to improve conformation. Included here is a chart that shows the heritabilities for a few traits. A high number or percentage means it is easier to change and a low number means it is harder to change from one generation to the next.

We always want to make better alpacas from one generation to the next, but as you can see, it is harder to improve conformation than it is to improve fleece, which means we should be extra careful not to breed alpacas that have a major conformation issue because it is hard to correct.

Genotype

This refers to the genetic makeup of an animal. An animal gets half of its genes from its mother and the other half from its father. But just because you have a gene for something, doesn't mean it is going to be expressed outwardly. There are all sorts of complicated switches and complex arrangements of genes that determine what we look like.

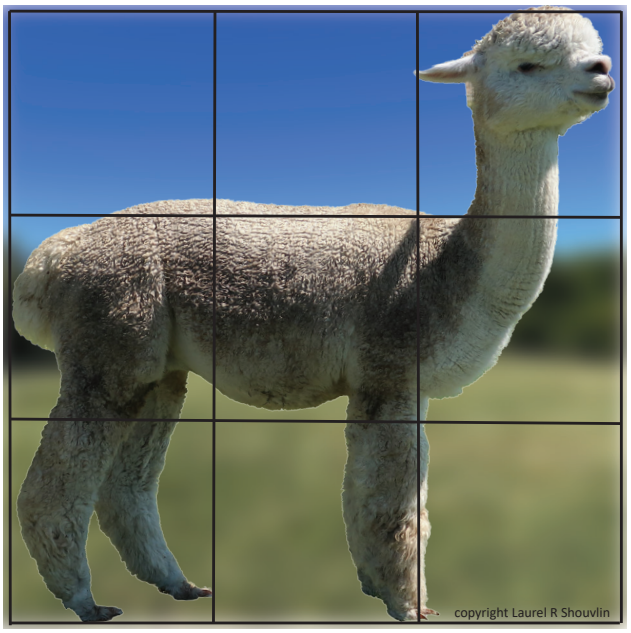
Phenotype

This term refers to what you actually see as a result the genetics that the cria has received from the parents and the influence of environment. You may have been born to be 6 feet tall, but if you didn't receive adequate food, minerals and vitamins, you might only get to five feet. If you became ill you might have your height affected. Even if your dad and mom were body builders, if you don't exercise, you will never have muscles like them.

When we look at an alpaca, it is hard for us to know how much the mom or dad is responsible for what it looks like, or how much environment has played a role, but both genetics and environment do have an effect.

Breed Standard

In 2007, the Suri Network, an affiliate of the Alpaca Owners Association (AOA) developed and its membership approved a breed standard for the Suri alpaca. In 2016 the AOA developed and approved a breed standard for the Huacaya alpaca and at the same time adopted the Suri Network's revised Suri breed standard. These documents identify the ideal, acceptable, and unacceptable traits of an alpaca and are included in the appendix of this handbook. One part of the standard refers to conformational traits and the other portion refers to fleece traits. The **AOA Emphasis Guide** is also provided in the appendix.



Correct proportion with neck and leg of equal length and 2/3 the length of the topline

Conformation

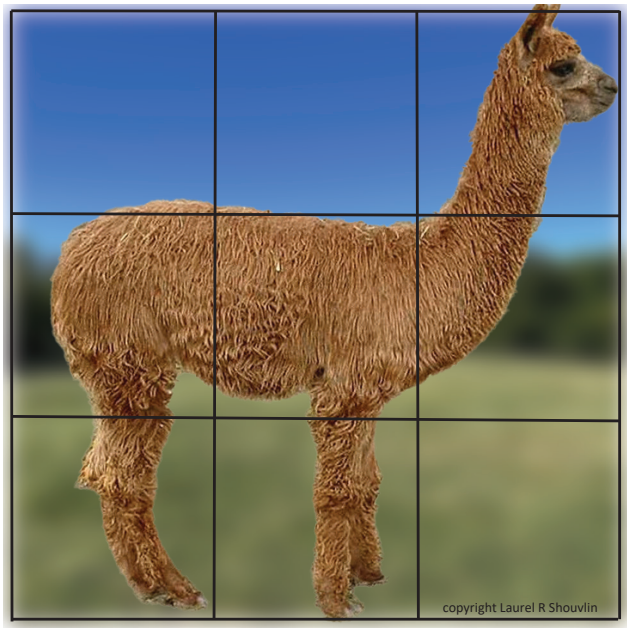
When we, a potential buyer, or a judge evaluates our alpacas, we should refer to the breed standards as we evaluate the animals. It is easiest if we review these things much as a judge does in the show ring.

Size: Alpaca females stand between 33 and 35 inches at the withers, while males stand between 35 and 37 inches.

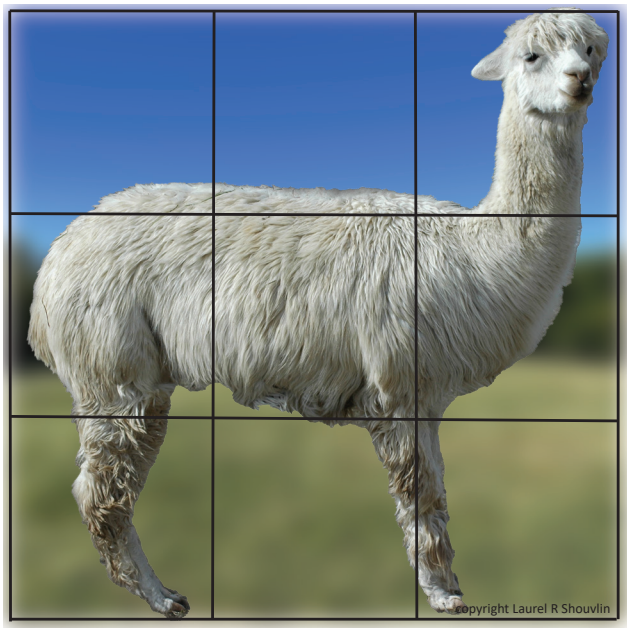
Bone refers to the diameter of the legs, most visible at the fetlock and pasterns because of the alpaca fiber. Greater or thicker **substance of bone** is preferred over spindly legs.

Balance

The term balance refers to how the limbs, trunk, neck, and head relate to one another-whether the length of the limbs is appropriate to the



The neck and leg are of equal length, but they are almost the same length as the topline



This alpaca has neck and leg of equal length, but their length is only 1/2 the length of the back

length of the back and neck. Proper balance occurs when the length of the neck and legs are equal and their length is 2/3 the length of the back. The photos below demonstrate proper and improper balance, but keep in mind that when an alpaca is in full fleece it can be more of a challenge to assess proportions.

Topline

The topline of an alpaca should be parallel with the ground. It should neither rise at the rump (croup) or at the whithers. Nor should there be a dip in the middle.

Head

The head should have a dense topknot. The muzzle should be wedge shaped and wide enough to allow for ease of airflow through the symmetrical nostrils

Straight topline

Roach back: topline rises toward rear

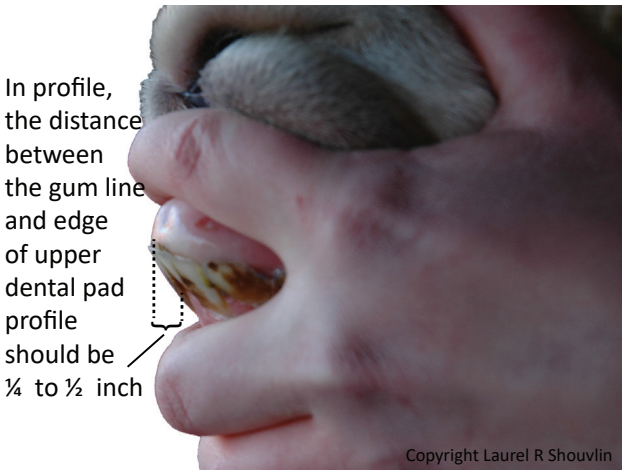
Sway back with high rump

Ears

The ears should be spear shaped and of appropriate length. Curvature or added length of the ears implies llama genetics being in the alpaca's background.

Teeth

The incisors are only located on the bottom jaw. The point where they originated from the lower gum should sit back 1/2 inch from the edge of the upper dental pad



Eyes

To properly assess an alpaca's eyes, you may need to lift the topknot fibers out of the way. The eyes should appear clear and bright. In white alpacas, blue eyes are often associated with deafness, though blue flecks or streaks

are generally acceptable. However, any eye discharge is a sign of a problem and is not acceptable.

Tracking, Movement, and Gait

If the alpaca is properly conformed with good proportion, balance, and leg conformation, it should walk so that the back feet follow and land in the same place the front feet land. If the feet are close together in front or back, it may appear as though the alpaca is walking on a tight rope. This is called **"rope walking."** An alpaca who swings its legs out to the side as they walk, is **"winging out."**

Movement

Poor conformation or injury can impede how an alpaca moves. A limp is an obvous indication that something is wrong, but sometimes there is simply a small wobble or wiggle. Observing your alpaca as it moves through the pasture can inform you of lameness or illness affecting your alpaca.

Gait

Gait simply refers to how an alpaca moves from one place to another.

- **Walk:** The slowest gait where only one foot comes off the ground at a time
- **Pace:** Two feet on the same side are raised off the ground
- **Trot:** Two feet are off the ground simultaneously, but on on opposite sides and opposite ends—so left front and right rear, then right front a left rear.
- **Gallop:** The fastest gait where the number of feet on the ground go from three to two to one.
- **Pronk:** This is the most fun gait to watch. It is as though the alpaca has springs for legs and the alpacas jump off all four feet simultaneously as they propel themselves gleefully around the pasture. It seems to be a contagious affliction that starts with one or two crias pronking across the pasture and then the yearlings kick in and soon are joined by some of the dams.

Front Legs

Viewed from both the front and the side, the front legs are supposed to be straight. A line drawn from the shoulder joint to the foot should be straight and perpendicular to the ground as seen in the provided photos.

The most common issue with the front legs is to be **"in at the knees."** **"Toeing out" or "toeing in"** where the alpaca's toes are not pointing forward as they should are also seen.

Viewed from the side, a line drawn from the shoulder joint to the foot should run straight through the knee and down to the foot.

Another common issue is being **base narrow**, where there is less space between the feet at the ground. **Base wide** can also occur where the feet are farther apart.

Correct front leg conformation

In at the knees and fine bone (rleft). Base narrow and average substance of bone and "toeing out" (right)

**Cocked fetlock (left).
Good substance of bone (right)**

Back Legs

Viewed from behind, the back legs should be straight with toes pointing forward. You should be able to draw a straight line down from the hip through the hock and down to the foot. When viewed from the side, a straight line can be drawn from the hip to the foot and be perpendicular to the ground (see right).

- **Cow-hocked** or "**in at the hock**" is one of the most common issues seen with an alpaca's back legs. This condition occurs when the hock joints angle inward toward the center of the body, causing the lower legs to rotate outward. As a result, the toes do not point forward as they should.
- **Sickle-hocked** is another common issue with the back legs. This condition occurs when there is excessive angulation at the hock joint, causing the foot to sit further forward rather than directly beneath the hip joint. The increased angulation shortens the leg, which can affect the alpaca's stride and movement. It often results in a lowered rump, leading to an uneven topline.
- **Post legged** refers to having too little angulation at the hock joint. This makes the leg too straight, causing a stiffer gait and forces the rump upward making the topline uneven.

Correct conformation

Fetlocks and Pasterns

The fetlock is the joint between the lower leg and the foot. The pastern is the region between the fetlock and the foot. Weakness in the fetlock joint can allow the pastern to move from being almost perpendicular to the ground toward being parallel with it. This can be referred to as **soft pasterns, dropped pasterns, collapsed pasterns, or down on the pasterns.**

Occasionally crias are born with lax tendons where multiple joints are not as straight and strong as they should be. With adequate nutrition, excercise and the tincture of time, these usually improve. If a yearling or older alpaca has soft pasterns these are not likely to improve and most likely will worsen as the alpaca ages.

Camped Under and Camped Back

These two terms refer to the position of the feet when viewing the standing alpaca in profile. Camped under occurs when the back or front feet are set up under the alpaca instead of under the hip or shoulder. Camped out is the opposit where the feet are camped out from under their respective joint- front feet abnormally forward or back feed abnormally back.

sickle hocked (left), post legged (middle), cow hocked (right)

camped under and base narrow

Base narrow

This has the same meaning in the rear limb conformation- the alpaca's feet when standing are placed close together. The top right photo illustrates this as well as fine bone.

Tail

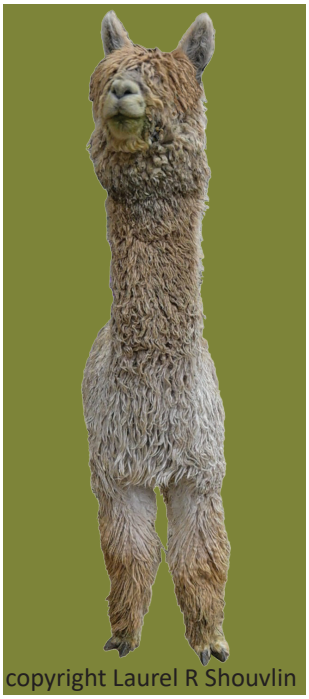
The alpaca tail is simply an extension of the backbone or vertebral spine. The tail should be straight and without any kinks or deformities. A kinked tail that cannot be straightened may indicate deformities further up the spine Therefore examining the tail of alpacas in the showring is part of the assessment.

Genitalia

The external genitalia of both sexes is examined for soundness. Abnormalities can affect fertility and the ability to breed. In the male the testicles are felt for adequate size for age, that both are even in size, and of correct texture- not soft or mushy.

In the female the tail is lifted to view the female anatomy to be certain that the vulva are normal in size, that the clitoris is not abnormal in size and the vaginal opening is sufficiently long to allow breeding and birthing. The female's teats are not examined in the show ring, but

soft pasterns (left), post legged and base narrow (right)



less capacity (left) and good capacity (right)

there should be four functional teats. Extra or malformed teats could interfere with a cria's ability to nurse.

Illustrations of genitalia provided in Chapter 10 on Alpaca Reproduction.

Capacity

This term refers to the conformation of the chest, abdomen, and pelvis. The chest cavity needs to be wide enough to allow free and easy breathing. The pelvis needs to be broad enough to allow for easy birthing by the female and to enable the male to mount the female during breeding.

What You Should Know

- Know the external anatomy of an alpaca (provided in the illustration at the start of the chapter).
- Familiarize yourself with the terms Heritability, Phenotype, and Genotype.
- Be familiar with the Suri and Huacaya Breed Standards (in appendix).
- Be familiar with the AOA Emphasis Guide (in appendix).
- Know the proper size of an adult male or female alpaca.
- Understand what is meant by balanced.
- Understand correct proportion of an alpaca.
- Understand the proper shape of the ears.
- Understand what is meant by a correct bite.
- Understand the proper conformation of the topline.
- Understand the proper conformation of the limbs.
- Be familiar with the following terms:
  - Bone and Substance of Bone
  - Rope Walking and Winging Out
  - In at the Knees
  - Toeing In and Toeing Out
  - Cocked Fetlock
  - Base Wide and Base Narrow
  - Cow Hocked and Sickle Hocked
  - Post legged
  - Soft or collapsed pasterns "down on pasterns"
  - Camped Under and Camped Out
- Understand why proper tail anatomy is important.
- Know proper anatomy of external genitalia.
- Understand what is meant by the term capacity and why it is important.

CHAPTER 14

The Alpaca Fleece

Introduction

Alpacas are raised primarily for their fleece and those who care for alpacas should have basic knowledge about alpaca fiber including anatomy of the skin, positive and negative fleece attributes, the difference between Huacaya and Suri fleece, shearing, fiber grading, and the many uses of the fleece after its harvest.

Nutrition

It may seem odd to include nutrition here, but there is a direct relationship between what an alpaca eats and the fiber it produces. To ensure the best fiber production, the alpaca caregiver must be sure to provide excellent forage, vitamins, minerals, and on certain farms and ranches, additional supplements. Good health in humans and other mammals is reflected in our skin and hair, and the same is true with alpacas.

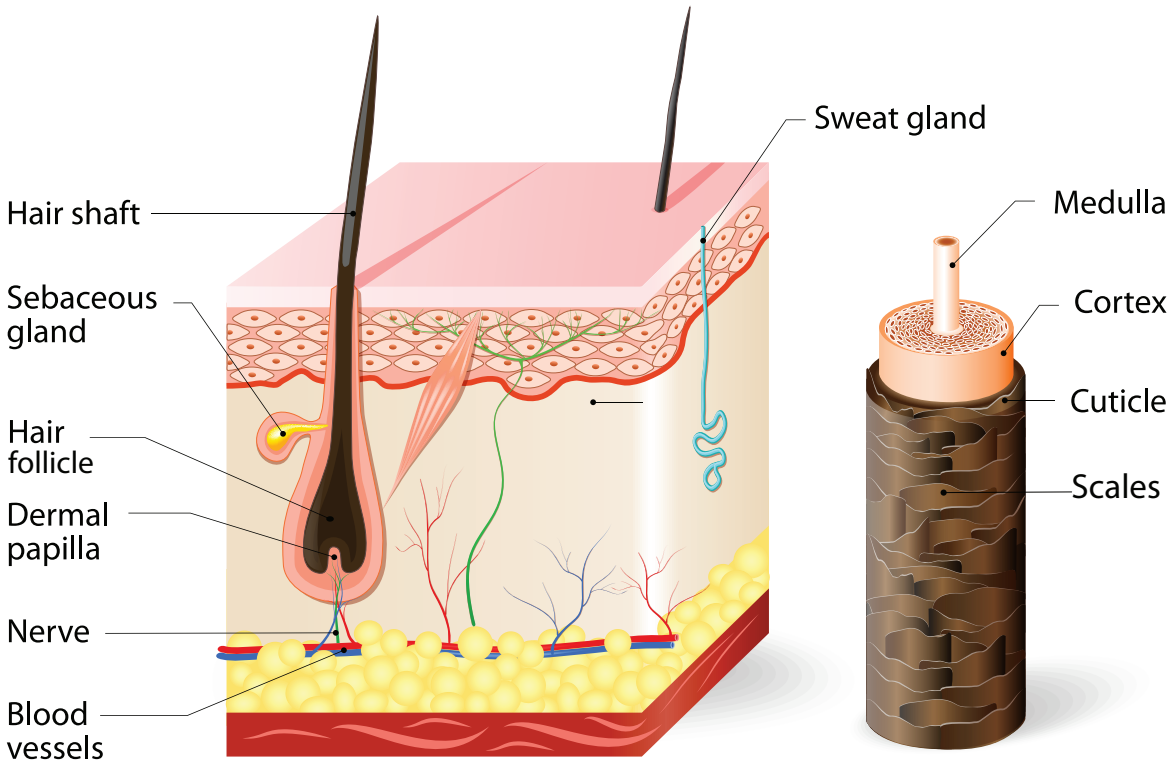
Skin & Hair Anatomy

The skin is the largest organ of the body. Skin protects the things lying underneath from injuries and infections and encloses our muscles and organs. It also helps to cool us when we are hot, and keep us warm when it is cold, especially if there is hair growing from it. In the illustration to the right, you can see a skin diagram.

There are sweat glands and sebaceous glands as well as nerves and blood vessels. The sweat glands are there to secrete sweat to help cool and the sebaceous glands produce oils lubricate the hair and to prevent the skin from getting dry and cracked. There are also nerves in the skin that allow us to feel pressure, pain, and hot and cold. There are even tiny muscles that can make our skin tighten and hair stand up when we have "goose bumps." Our skin is very similar to the skin of alpacas except we do not have as much hair.

- **Hair Follicles:** The part of the skin that alpaca owners are especially interested in is the hair follicle. These are the structures that produce the hair which we also refer to as fiber. Alpacas produce two different types of hair fibers- primary and secondary. They referred to as "two coated" animals.
- **Primary Fiber:** There are fewer primary fibers in an alpaca's fleece. Usually, primary fibers are coarser and straighter, but they do not have to be! Through selective breeding, alpaca owners are trying to make the primary fibers of their alpacas as fine as the secondary fibers. When the primary fibers are fatter than 30 microns they are referred to as guard hairs. The concentration of primary fibers is higher on the legs, on the chest, and on the belly. The strong, stiff primary fibers can poke out of yarn and irritate your skin. This is referred to as prickle factor.
- **Secondary Fiber:** Hopefully there are many more secondary fibers than primaries in an alpaca's fleece. The secondary fibers are thinner and finer than primaries. We want our alpacas to have as many secondary fibers as possible, and we want them to be fine because finer fiber feels more comfortable to our skin when we wear a garment

HAIR ANATOMY



made from alpaca. The concentration of secondary fibers is highest in the part of the alpaca fleece called the blanket.

- **Cuticle and Scale:** One of the most important characteristics of alpaca and especially Suri alpaca is the scale height and length on the outside of the fibers. These scales are like those on a fish or snake, where one edge is anchored, and the other edge is raised away from the shaft of the fiber. In different animals, the scales can be longer or shorter, and the edge can be very tight to the fiber, or it can stick out. Even at this microscopic level, it affects how the fiber feels when we pass our fingers over it.
On the next page is an electron microscope view of a Suri alpaca on the right, and a merino sheep fiber on the left. Notice how you can't even tell that the Suri scale is protruding from the fiber! Look at how long the scales of the Suri fiber are. As your eye follows the length of the fiber it is almost a smooth line, but the merino fiber is bumpy. That smoothness of the Suri Fiber also allows it to reflect light well. That is referred to as luster in Suris and brightness in Huacayas.
- **Luster and Brightness:** In Suris we speak about luster and in Huacayas we refer to the same quality as brightness. Both terms are referring to how the fiber is reflecting light. This is a very important trait in Suri alpacas. Luster and brightness are determined by several microscopic features of the fibers. The length of the

cuticle scale, the height of the cuticle scale, the shape of the fibers (whether they have ridges or are round or oval), the uniformity of micron of the fibers, and the overall health of the alpaca.

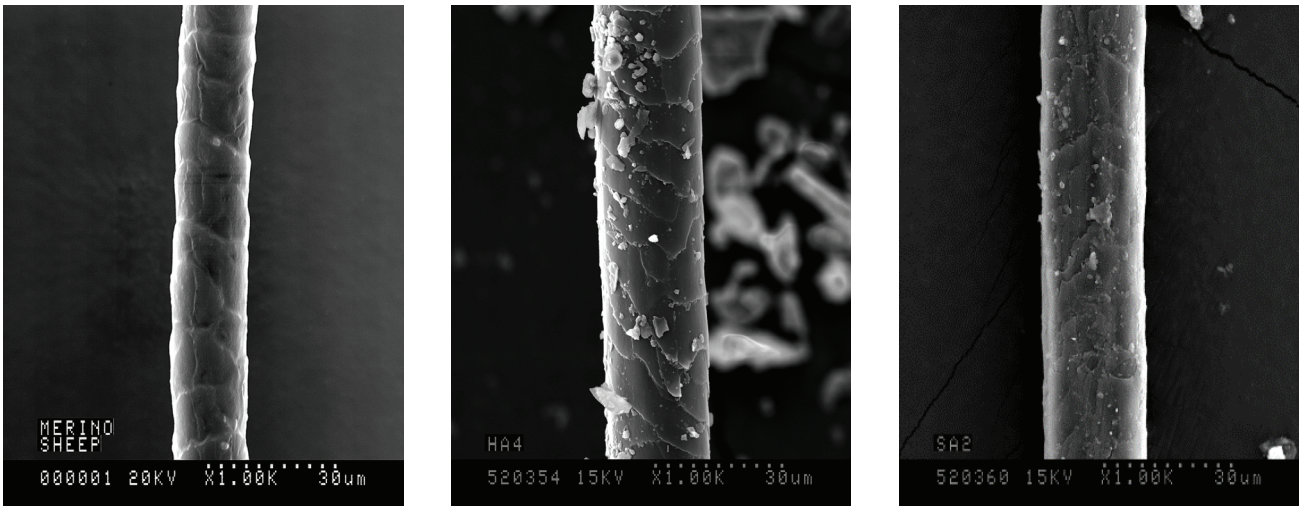
The Fleece

Sometimes we refer to the hair of an alpaca as fleece and sometimes as fiber or just as alpaca. These three terms are used in the same way. In other parts of the world, it may be referred to as wool, but we try to set our beloved alpacas apart from sheep and stay away from using the term "wool", even though it is technically correct.

- **Colors:** Alpaca fleeces come in a wide range of beautiful colors from white to black and some are even spotted like appaloosa horses! White or lighter shades of alpaca fiber can be dyed into many different colors.The natural shades of fawn, brown, gray and black are beautiful as well and many fiber artists appreciate the variety of natural colors alpacas provide with no chemical dyes necessary to get them.

When an alpaca is registered with the Alpaca Registry, the color is recorded and when alpacas or their fleeces are showed in competitions, they are placed into different classes determined by their ages and colors. The AOA has a special card with fiber samples attached that demonstrate the different colors and shades alpacas are registered as.

- **The Blanket:** This is the term used to refer to the best fiber that is shorn from an alpaca. The blanket starts on the topline from the base of the neck and extends to the croup or head of the tail. It extends down both sides and onto all four legs and to the belly. As an alpaca is shorn, the blanket goes into one bag, the neck fiber and some of the leg fiber into another bag, and the fiber from the legs into another bag.
- **Seconds & Thirds:** These two terms refer to the less desirable fiber that is shorn from the alpaca that is not part of the blanket. It is coarser fiber and usually holds higher quantities of primary fibers. "Seconds" would include the neck fiber



Pictured above are three electron micrographs of the fiber from a merino sheep (left), and Huacaya (middle) and a Suri (right)

Notice how the scales are more pronounced on the merino, less pronounced on the huacaya, and hard to see on the suri.

and some of the leg fiber. Thirds include fiber from lower parts of the leg, the chest, and belly. The seconds and thirds are not suitable for making clothing that will be worn next to skin, but can be used for other projects such as rugs.

- **Second cuts** are short pieces of fleece that result from the shearer shearing an area twice. They are undesirable.

Two Fleece Types

There are two alpaca fleece types- the Huacaya and the Suri. Suri fiber grows relatively straight and hangs in locks. Huacayas have fiber that has a zigzag pattern called crimp, and the fiber grows out from the skin similar to a sheep in groups called staples. When Suris and Huacayas are newly shorn they look very much alike, but when their fleeces grow out, their appearance is very different.

An advanced and beautiful huacaya fleece

Shearing

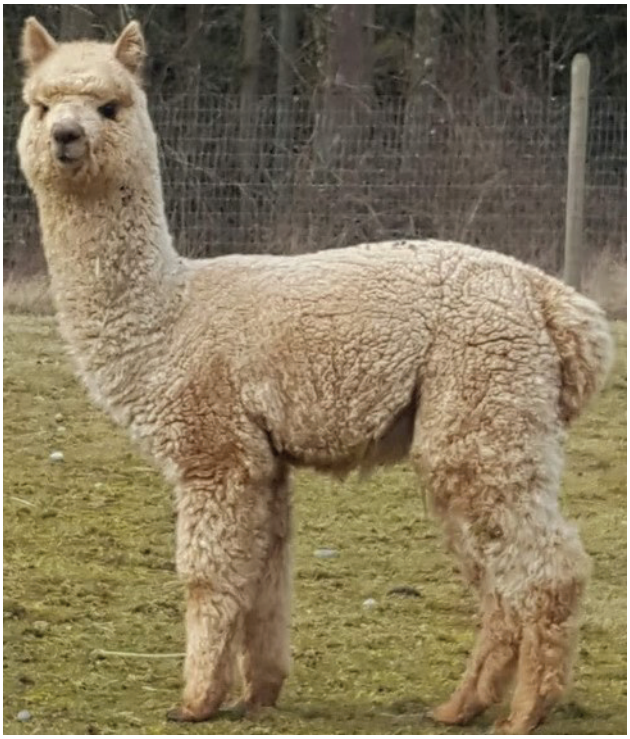
Alpacas are shorn once a year in the spring. This timing allows the alpacas to be comfortable in the warmer months of summer. Shearing day is a big day on the farm when the alpaca owner harvests the fleece that has been growing for close to 12 months. Some alpaca owners will do their own shearing while others will hire a professional shearer to come to the ranch.

The shearing area must be clean and have enough room for the shearer and the rest of the team to safely restrain the alpaca and remove the fleece. The alpacas should be dry, and their fleece should be as clean as possible so that very little must be picked out of the fleece before it is used to make yarn or other products.

The shearer cannot do their job without help from others who bring alpacas in and out, gather the fleece into bags, hold the alpaca's head, and possibly trim the teeth and toenails while the alpaca is restrained. It is important to make sure there are enough people to guarantee the day goes smoothly.

Here is a potential list of volunteers to recruit:

- Fleece gatherer/bagger. This should be someone who understands that certain parts of the fleece belong in different bags to optimize the fleece harvest.
- Person to cut toenails and give any necessary worming shots or immunizations.
- 2 people to bring each alpaca into the shearing area.
- 1 person to sweep up and/or vacuum the bits of fleece and debris left after each alpaca is shorn.



A young huacaya is pictured above. To the immediate right is a photo of examples of fleece samples with well defined staples, very fine fiber, and no visible coarse primary fibers. The bottom sample is coarser and the crimp is less defined. Stronger primaries are protruding from the top of the sample.

- Typically, the shearer will bring a "head man" who will help hold the alpaca's head and move them from side to side as shearing occurs.

Here is a list of supplies for shearing day:

- Toenail trimmers.
- Tooth grinders or cutters to trim overgrown incisors and canine teeth.
- Three by five index cards and a marker. Write the alpaca's identification on the cards, then place them in the fleece bags.
- Bags to "noodle" and place the shorn fleece in.
- Small baggies with their own index cards for mid-side fleece samples taken for histograms (see below).
- Ivermectin or Doramectin injectable to prevent meningeal worm.
- Tetanus or other vaccines.
- Cheap tube socks to loosely place over the muzzle of "spitty" alpacas.

Pictured above is a Suri, a sample of Suri locks with excellent luster and uniformity, and a lesser quality fleece showing locks that are dull and less organized

- Rolls of paper towels to absorb urine and to clean up spit.
- Foam pad to lay the alpaca onto for shearing. Many use the 2' X 2' square jigsaw-like tiles that can be found at home improvement stores such as Lowes or Home Depot. A 6' X 8' area is the perfect size for everyone's comfort.
- Drinks and snacks for everyone to keep the team happy and energetic!

Skirting and Sorting

After shearing is complete, the fleeces must be spread out on a surface and prepared for whatever processing or use comes next. The term "skirting" refers to the edges of the blanket where the quality changes as the fleece moves into the blanket and down the legs, like the hem of a skirt. At the edges the fiber becomes coarser and should not be included with the blanket or it will lower the quality of whatever is made from the blanket. At the same time, bits of manure and vegetable matter are removed.

Sorting refers to closely evaluating the different areas of the fleece for fineness. Larger herds may or may not sort their harvest. Each fleece is sorted into different grades based on that fineness. A single fleece may consist of three or more different grades as the assessment moves through the blanket. Each of these grades is suited for different uses. As sorting occurs different portions of the blanket will go into different bags containing sorted fiber of the same grade. Sorting also includes separating the fiber by length and color as well.

Following is the United States Alpaca Fiber Standard:

Alpaca fiber shall be recognized within the seven (7) grades defined by micron span as follows:

Grade 0: 15.0 – 16.9 micron

Grade 1: 17.0 – 19.9 micron

Grade 2: 20.0 – 22.9 micron

Grade 3: 23.0 – 25.9 micron

Grade 4: 26.0 – 28.9 micron

Grade 5: 29.0 – 31.9 micron

Grade 6: 32.0 – 34.9 micron

Length shall be within the following processable ranges (Processing length should be uniform across the blanket):

- **Huacaya: between 2 and 5.5 inches**
- **Suri: between 2 and 7.5 inches**

Histograms

This laboratory test is used by many in the alpaca industry to assess their alpacas' fleece qualities. A 2" X 2" sample is either pulled from a specific area in the blanket of the shorn fleece, or cut from the fleece on the mid-side of the alpaca. The sample is then sent to a special laboratory and tested to provide specific values which then give the alpaca owner an accurate assessment of their animal's fiber. Following are brief explanations of the values provided:

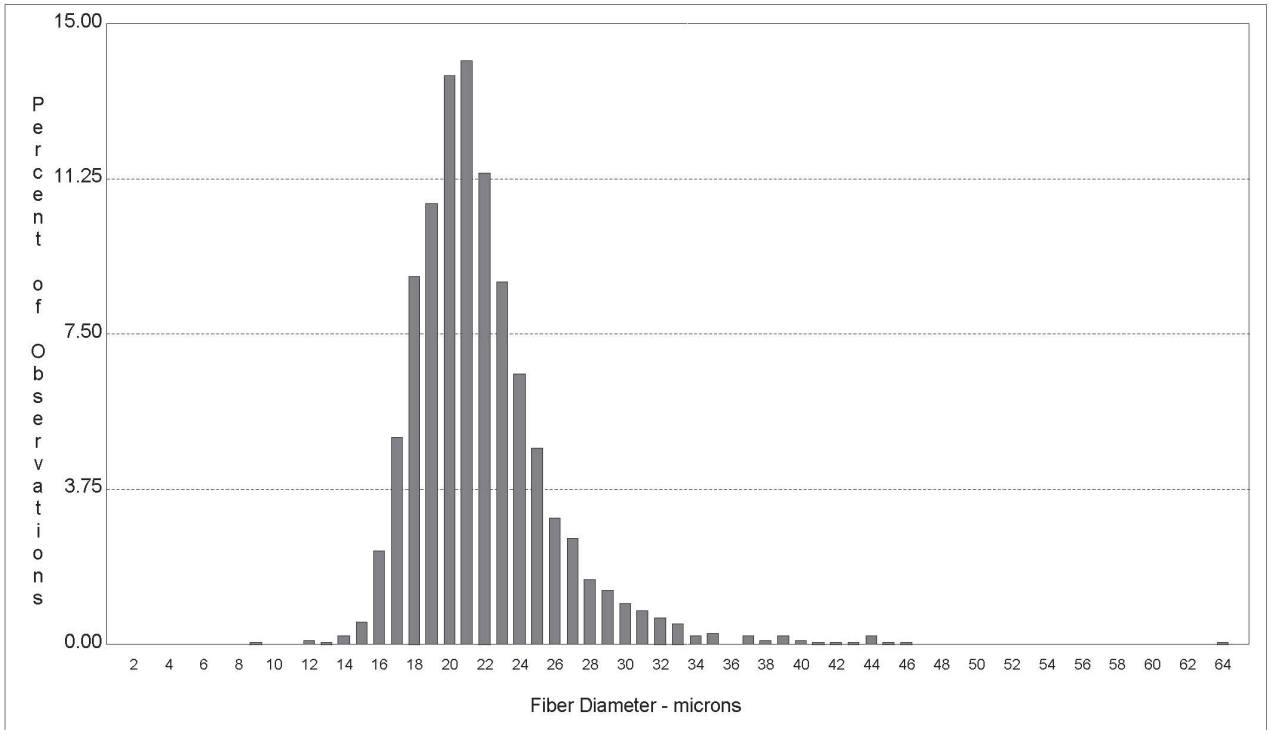
- **Average Fiber Diameter (AFD):** This is the average micron of all the fibers tested from the sample.
- **Standard Deviation (SD):** this tells how much variation in micron exists within the sample. It tells how uniform the sample is. The lower the number the better the uniformity of micron. An SD of 3.5 means that 68 percent of the sample falls either 3.5 micron less or more than the average fiber diameter.
- **Coefficient of Variation (CV):** is a calculation that is a better determinant of variation than is SD alone. This provides a better picture because if your AFD is 15 and your SD is 3.5 (giving a fiber range of 11.5 to 18.5), that range varies much more than a fleece sample with an AFD of 28 (24.5 to 31.5).
- **Comfort Factor:** This simply measures the number of fibers over 30 micron (remember these are what we call guard hairs).

Animal and Sample Description

Animal Name:		**Animal ID:**	XXXXX
Breed:	Alpaca(Suri)	**Sample Location:**	Side
Sex:	Male	**Sample Date:**	05/17/08
Color:	XXXXX	**Age:**	1 Yr

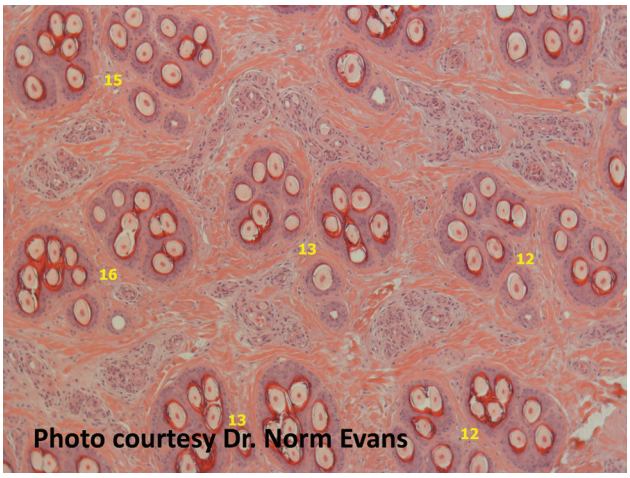
Laboratory Data

Mean Fiber Diameter:	21.8	microns
Standard Deviation:	4.1	microns
Coefficient of Variation:	18.8	%
Fibers Greater Than 30 microns:	3.5	%



Histogram sample

- **Curvature:** A measure of crimp (the zigs and zags in Huacaya fiber. It is not provided for Suri).
- **Medullated Fibers:** Some fibers are not solid and have hollow spaces in their middles. This is called medullation and is a negative trait. It can only be seen in white, beige, and lighter fawn fleeces. Medullation is usually found in coarser fibers, but occurs in finer fiber as well. It makes the fiber stiffer and interferes with dyeing.
- **Staple Length:** The actual length of the fiber from skin to its outer tip. If fiber is too long, it gets torn in the carding and spinning process and if too short it can't spin at all.



Skin Biopsy showing the number of follicles within that particular follicle group.

Skin Biopsies

This testing is much more expensive than a histogram. A small skin sample is taken from the side of the alpaca, placed in a preservative solution, and shipped to a laboratory where it is cut into very thin slices, stained, and examined under the microscope. A technician counts the number of follicles within a certain area and provides photographs of what is seen under the microscope. This test counts the number and type of follicles leaving the alpaca's skin. It can also differentiate between primary and secondary follicles and how uniform they are with one another. This test is most meaningful after the alpaca has reached adulthood at age two or more. The numbers on the picture reflect the number of follicles within that particular follicle group.

Fleece Terminology:

Both alpaca owners, alpaca judges, and fiber artists use specific terminology related to alpaca fiber. Below are some of the more common terms with explanations of what they mean and why they are important to consider.

- **Fineness:** This refers to the actual width of the individual alpaca fiber. The finer the fiber, the less prickly it will feel in yarn and against your skin. Fineness can be described by micron and trained judges can be pretty good at looking at alpaca fiber and providing a micron. Grades (discussed in on the previous page) are a way to group alpaca fleeces of the same micron range together. If determining the grade is done well, the products made from that fiber will be outstanding.
- **Uniformity:** This term is used for several fleece traits
  - **Uniformity of Length:** High quality yarn is made from fibers of similar length. If the fibers vary, the ends of the shorter ones will gradually migrate to the outside of the yarn and possibly cause some prickliness. The yarn won't be as even in width and will get fatter and skinnier along its length if the fiber length varies.
  - **Uniformity of Color:** We want our alpacas to have uniformly colored fleeces so that the garment does not change in color from one part to another because the yarn wasn't even in color because the alpaca fiber was uneven in color. Sometimes light-colored fleeces will have darker fibers sprinkled around in them and the yarn then has these very noticeable dark hairs. Nobody wants a nice white sweater with black fibers here and there.
  - **Uniformity of Micron (or fineness):** If the fibers in a handful of fleece are very similar in micron they can feel soft and buttery when you rub them between your fingers. This is called have a soft

hand. Even if the micron is coarser, if the fibers are uniform in that micron, it can still feel very nice.

- **Hand:** This term simply refers to how fiber, yarn, or cloth feels when you pass your hand over it or rub it between your fingers. A soft hand is one of the biggest selling points of alpacas

Fleece Competitions

The Alpaca Owners Association and its Affiliates offer four competitions involving fleece. These competitions are judged by AOA Certified Judges who have been specially trained and are required by the association to maintain their certification by attending regular continuing education.

- **Regular Fleece Shows:** These are the most common fleece competitions conducted across the country. The skirted blanket is sent to compete against other fleeces of alpacas in the same age and color group. They are the least expensive competitions because there is no travel or hotel expense to compete. Fleeces can be shipped to the competition. The alpaca owner does not have to be present.
  The fleece is given points for various traits independent of the other fleeces in the class and the fleeces are ranked according to the points they were awarded. Fleeces are judged on their weight, fineness, handle, uniformity of length, color, and micron, brightness and luster, impurities and damage, density, and character.
- **Walking Fleece Shows:** These competitions occur simultaneously with halter competitions (where the entire alpaca is evaluated comparatively in the show ring).
  In Walking Fleece, the alpacas are brought to the judge one at a time and still wearing their fleeces. Even though the whole alpaca is there, only the fleece is judged, and points are written down. The judge may even have a moment to point out some of the strengths and weaknesses of the alpaca's fleece. As with the regular fleece show, points are awarded for fineness, handle, uniformity of length, color, and micron, brightness and luster, impurities and damage, density, and character. When all the alpacas in a class have been assessed, they are ranked and awarded ribbons according to their placement.
- **Innovative Fleece Assessment (IFA):** This new competition utilizes a machine called a Fibrelux which measures the micron of 4 fleece samples taken by the judge from very specific locations. Based on the average of those measurements, the fleece is placed into a Grade to compete against other fleeces of the same grade. As with the above competitions, the fleece is evaluated by the judge for the same traits. Length is also assessed closely. The exhibitor is not only given information about the grade of their fleece and its

other traits, but also suggestions about its end use and how to best put it into product.

- **Spin-Off Fleece Competitions:** This unique competition utilizes a 2 to 4 ounce sample of fiber from the entered fleece. The evaluation given by a Spin-Off judge provides a broad range of evaluations from first impressions of the raw fiber sample to evaluating it for flaws such as excessive guard hairs, tenderness and second cuts. After preparation, the judge spins the sample into yarn and evaluates it for positive and negative traits. The entrant is given a small skein of yarn from their fleece sample as well as an extensive score card. The fiber is scored on the initial assessment of the same traits as a regular fleece show. Additional points are awarded on the ease of preparation and spinning. After spinning into yarn, points are determined for the quality of the traits within the yarn. Lastly, suggestions are made on how to best use the fleece. As with other fleece competitions, the points are added and those fleece samples with the highest points win their class.

Auxiliary Competitions

Some fleece shows offer additional competitions that allow exhibitors to show off their talents in spinning and fiber arts. It is required that the entries be at least 50 percent alpaca fiber. At many shows, these competitions are free to those 18 years of age and younger.

- **Hand Spun Skein Competition:** This gives spinners the opportunity to showcase their skill working with alpaca fiber.

The competitions include divisions for young and adult beginners, as well as intermediate and advanced spinners. The spinner submits a skein that is at least 50 yards in length. To learn more about this competition and the entry requirements, visit the AOA website.

- **Fiber Arts Competitions** are another opportunity for exhibitors to showcase their talents. A full description of the different contests and the requirements to enter is provided on the website. There are divisions for youth and adult beginners as well as intermediate and advanced artists. Items entered in the fiber arts show can be woven, crocheted, knitted, felted or some other handiwork and there are several categories for the pieces such as clothing, accessories, and home goods.

What You Should Know

- Understand the basic anatomy of the skin.
- Know what a follicle is.
- Know the difference between primary and secondary fibers.
- Understand what the cuticle and scale are on a hair fiber.
- Understand the differences between huacaya and suri fiber.
- Familiarize yourself with what is involved on shearing day.
- Understand what it means to skirt a fleece.
- Understand what grading and sorting are.
- Know what a histogram is and what it measures.
- Know what a skin biopsy is.
- Familiarize yourself with the following terms:
  - Fineness
  - Uniformity of length
  - Uniformity of micron
  - Uniformity of color
  - Hand
- Know the five different types of competitions offered by AOA
  - Regular Feece competition
  - Walking Fleece
  - Innovative Fleece Assessment
  - Spin-Off
  - Fiber Arts

CHAPTER 15

Using Alpaca Fiber

Skirting table made with PVC and netting that permits vegetable matter and dung (but not cats) to fall through.

Introduction

There are endless possibilities for using alpaca fiber and ALL alpaca fiber can be used in some way. The finest fiber can be used to make clothing and accessories that feel luxurious next to the skin and the coarser fiber can be used for rugs, blankets, and more.

There are many fun projects suitable for all age groups to create useful items from alpaca fiber, and a youth club can be organized and centered completely on fiber arts exploring knitting and crochet as well as dyeing, weaving, felting, and spinning. If the leader is not comfortable teaching a particular fiber art, there are many who are willing to donate their time to encourage future generations of fiber artists. Fiber Art guilds are an excellent place to begin the search for such people. Fiber arts stores and art centers can also be great resources for finding individuals with expertise to share.

If club members create fiber art, either as part of their club activities or on their own, they may want to enter their creations in a fiber arts competition. County and state fairs as well as

alpaca shows may have fiber art competitions for youth, and occasionally the entry fees are waived for those 18 years of age and younger. Also, an alpaca club might want to have an activity such as knitting hats for those who can't afford them, lap blankets for elderly, or felting sleeping mats for displaced persons to encourage youth to think about doing kindness for others.

In the previous chapter we learned about alpaca fleece characteristics and some of the terminology used when evaluating fleeces and using their fiber. This chapter will talk about how to process alpaca fiber and how it is spun into yarn. We will also briefly discuss both natural and chemical dyeing and, of course, there is a brief discussion about the different fiber arts.

Fiber art guilds are a tremendous resource for club leaders, parents, and youth. They exist to perpetuate their craft and offer classes to pass on their craft along with their expertise. Often guilds will have equipment such as spinning wheels or looms to use as well. It is encouraged that you see what guilds exist in your area. Community art centers may also offer classes or be able to provide you with the names of instructors as well.

An additional section of this manual is devoted to some fun fiber art projects. As time goes on, more projects will be added to these resources to hopefully instill in the participants a lifelong love for alpaca and fiber arts.

Processing Alpaca Fiber

Processing can be performed either by hand, by machine, or a combination of both. There are several steps to create usable material for fiber arts. There are many mini mills around the country that will process individual fleeces into yarn.

- **Skirting a fleece:** This was discussed in the last chapter, but it refers to removing the vegetable matter, dung, second cuts, and dirt from a fleece. Fleeces should be skirted before processing by hand or machine to ensure that the final product is of the highest quality obtainable from that fleece.
- **Washing:** One of the wonderful things about alpaca is that it does not contain lanolin- also called grease- like sheep fleeces do. Grease and the dirt that sticks to it is difficult to remove, and requires strong detergents and many washes to remove.
  Alpaca fleeces do hold plenty of dirt, and that should be removed, but fewer washings are necessary. Liquid dish soaps are excellent for getting fleece clean. Two or three baths may be necessary to get the fleece clean enough for spinning or machine processing. Using less detergent than needed when washing wool makes alpaca fiber more environmentally friendly. If you are having processing done at a mill, they usually offer fleece washing as one of their services.
  Soaking in warm, soapy water and then rinsing is the best method for removing the dirt. Care must be taken in the washing process to avoid agitating the fiber too much for it can get clumped together or felted which makes it unusable for making yarn. Mini mills and commercial processors have special washing machines to accomplish this.
- **Picking:** Some will "pick" the fiber before washing and some will wait until after washing. Picking refers to the fleece being fluffed up, opening the staples or locks of fiber to help separate them in preparation for carding. A rather vicious

looking machine with a drum covered in spikes runs over the fleece and breaks open and flings the fleece into an airy and disorganized pile.

- **Flicking:** This technique is only used by hand spinners. A small brush (pictured right) is used to "flick" the fiber to bring it into alignment for easier and even hand spinning. Both ends of the Suri Lock or Huacaya staple are brushed, which simultaneously opens the fiber and brings them into alignment. This makes it easier for the hand spinner to create yarn that is even in width with fibers that are well aligned with each other making the yarn stronger.
- **Combing:** This process is not always performed by mills or by hand spinners, but it is used to create highly aligned fibers that are parallel with one another. When they are created in a mill, they are long thick untwisted ropes of fiber called top. Yarn produced from them is called semi-worstd or worsted, and is very strong and not as lofty or poofy as woolen yarn that is made without combing and only cards or a carding machine. Worsted yarn is most often used to create woven fabric instead of knitted or crocheted items.
- **Carding:** This process can either be done by hand using two "cards", by a small hand cranked carder, or by a large machine like the one pictured to the right. Each of the methods uses carding cloth that holds hundreds of small, uniformly bent and placed wires that open up and organize the fiber into uniform sheets of fairly aligned fibers for the spinning process. The photo of the flicker brush here has the same carding cloth.
  The large carding machines in fiber mills have several large drums covered in carding cloth that send the alpaca fiber through them to create either a big sheet of carded fiber or a consolidated length of fiber called a sliver (sliver is pronounced like "driver"). Sometimes the sliver is also referred to as a roving.
  Hand carding produces organized rolls of fiber called rolags which are then taken to the spinning wheel and one by one spun into single ply yarn. The yarn produced this way is called woolen yarn and has

more air spaces that makes it thicker, fluffier, and more insulative.
Hand cranked and machine drived carders create sheets of layers of carded fiber called a batt can be used by hand spinners to spin yarn, or it can be used for felting or fill in a quilt. The sliver or roving can also be used by a hand spinner, or it can be fed into the next machine called a pin drafter or gilling machine. This machine further aligns and evens out the fibers in preparation for the next step.

- **Spinning:** The roving or sliver is then fed into the spinning machine which gently pulls to lengthen the sliver and then twists it into a single strand of yarn. Hand spinners use the same principle to spin their yarn although they use either a drop spindle or a spinning wheel. The machine wraps the yarn around a bobbin, just like thread on a spool.

Participant using hand cards at the Fleece to Shawl demonstration at the AOA National Alpaca Show.

At this point, the yarn can be used for knitting, crocheting, or weaving. Some fiber art guilds have hand spinning instructors available, and even spinning wheels available for enthusiasts to try out.

- **Plying:** This process refers to taking two or more strands of yarn and twisting them together. Yarn can be single ply, 2 ply, 3 ply and more. As more strands are plied together the yarn gets fatter and much stronger. Sometimes spinners or mills will take different colors of yarn and twist them together to make variegated yarn. This can be done by machine or by using a spinning wheel.
- **Cones or Skeins:** When the entire process is complete, the yarn is either wound onto a cone or put into skeins (usually pronounced like rains) which are big loops of yarn. If the yarn is to be dyed, the loose skein makes it easier to get the dye to reach all the yarn evenly.

Blending Fibers with Alpaca

At one time alpaca owners only wanted to produce 100 percent alpaca yarn, but now we often enjoy blending alpaca with all types of different fibers to add interest, texture, color, sparkle, strength, or durability. It is great fun to see what different and unique yarns can be made.

Typical blending fibers include merino top, silk, bamboo, tencel, yak, nylon, and sparkle angelina to name a few. It is advisable to consult with your mill operator to find the fibers and ratios that will work best for your fiber and the project you want to use it for.

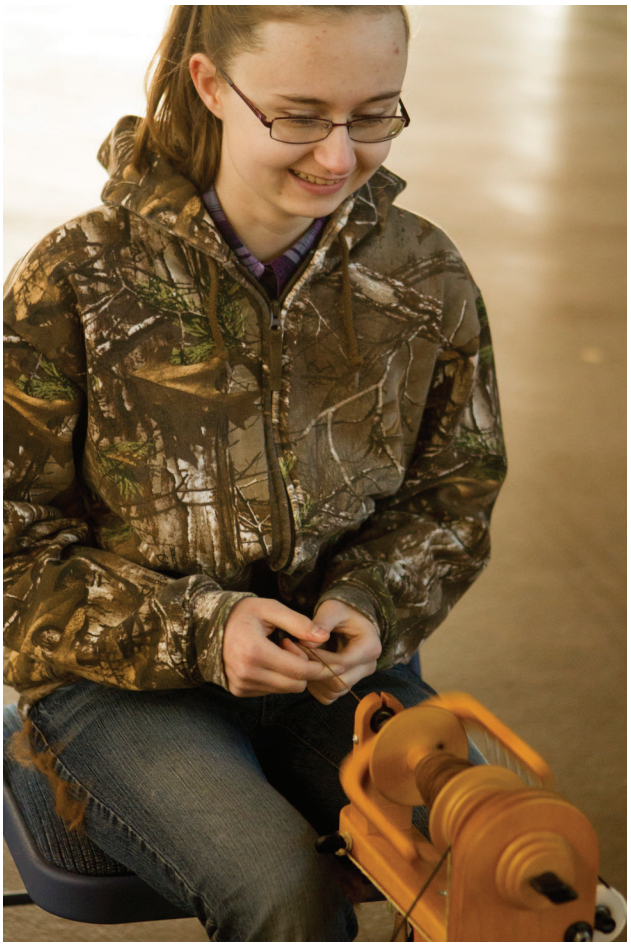
International Yarn Standards

One of the biggest challenges in fiber arts is acquiring yarn that is appropriate for your specific project. There are many different labels used to describe how thin or thick a certain yarn is, and depending on where you are in the world, those labels might mean different things.

The Craft Yarn Council has worked to standardize all the measurements, symbols, needles, pattern abbreviations, and weights of yarn intended for crocheting and knitting. They have contacted manufacturers all around the world to attempt to make this a global standard. Their information can be found online and the chart included on the next page is from the Craft Yarn Council at **www.YarnStandards.com**.

Dyeing Alpaca Fiber and Yarn

Even though alpacas grow their fleece in a wide range of natural colors, dying alpaca fleece is great fun and a rewarding youth group activity. Using plants for dyestuff or food coloring such as Kool-Aid (unsweetened) or Easter Egg dyes can keep it safe too. Dyeing is magical as the color leaves the liquid and adheres to the fiber leaving almost clear liquid behind. It can be a small science lesson as you learn about the fiber structure and how dye is absorbed. It can be a math lesson when you use chemical dyes and weigh out a certain amount of dye per ounce of fiber or yarn.



Spinning for the Fleece to Shawl Demonstration.

Kool-aid Dyeing: This is a youth friendly and safe dye project. It is probably best to do this outside or in a room where spills won't stain carpet. Depending on the group, it might be best to have general group bags of fiber instead of each youth having their own. That way when you go to use the fiber for different projects, every color can be used by the whole club. Leaders, it may be a good idea to do the

Yarn Weight Symbol & Category Names	LACE 0 DENTELLE Liston	SUPER FINE 1 SUPER FIN Super Fino	FINE 2 FIN Fino	LIGHT 3 LÉGER Ligero	MEDIUM 4 MOYEN Medio	BULKY 5 BULKY Abultado	SUPER BULKY 6 TRÉS ÉPAIS Super Abultado	JUMBO 7 GÉANT Jumbo
Type of Yarns in Category	Fingering 10-count crochet thread	Sock, Fingering, Baby	Sport, Baby	DK, Light Worsted	Worsted, Afghan, Aran	Chunky, Craft, Rug	Super Bulky, Roving	Jumbo, Roving
Knit Gauge Range* in Stockinette Stitch to 4 inches	33–40 sts	27–32 sts	23–26 sts	21–24 sts	16–20 sts	12–15 sts	7–11 sts	6 sts and fewer
Recommended Needle in Metric Size Range	1.5–2.25 mm	2.25-3.25 mm	3.25-3.75 mm	3.75-4.5 mm	4.5-5.5 mm	5.5-8 mm	8-12.75 mm	12.75 mm and larger
Recommended Needle U.S. Size Range	000–1	1 to 3	3 to 5	5 to 7	7 to 9	9 to 11	11 to 17	17 and larger
Crochet Gauge* Ranges in Single Crochet to 4 inch	32–42 double crochets	21–32 sts	16–20 sts	12–17 sts	11–14 sts	8–11 sts	7–9 sts	6 sts and fewer
Recommended Hook in Metric Size Range	Steel** 1.6–1.4 mm Regular hook 2.25 mm	2.25-3.5 mm	3.5-4.5 mm	4.5-5.5 mm	5.5-6.5 mm	6.5-9 mm	9-15 mm	15 mm and larger
Recommended Hook U.S. Size Range	Steel*** 6, 7, 8 Regular hook B–1	B–1 to E–4	E–4 to 7	7 to I-9	I–9 to K–10 1/2	K–10 1/2 to M–13	M–13 to Q	Q and larger

* GUIDELINES ONLY: The above reflect the most commonly used gauges and needle or hook sizes for specific yarn categories.
** Lace weight yarns are usually knitted or crocheted on larger needles and hooks to create lacy, openwork patterns. Accordingly, a gauge range is difficult to determine. Always follow the gauge stated in your pattern.
*** Steel crochet hooks are sized differently from regular hooks—the higher the number, the smaller the hook, which is the reverse of regular hook sizing

project yourself ahead of time to familiarize yourself with the process and help prevent disappointments or disasters.

What you need:

- Alpaca fiber that is clean (without manure or vegetable matter in it) and washed.
- 1- or 2- gallon size sturdy ziplock type bags to hold liquid and fiber.
- Packets of different flavors of Kool-aid or other instant sugar free drink. You can also use Easter egg dye or food coloring out of a bottle. More dye will create more intense colors and the dyes can be combined to create even more colors.
- White Vinegar to make the dye bath acidic. Animal fibers need acidic (lower pH) solutions for dyes to be absorbed well.
- A box to place the filled plastic bags in to keep them upright and protected.

Water is placed in the zip-lock bag, 1 or 2 tablespoons of vinegar are added with the “dye, and once thoroughly mixed the fiber is placed in the bag. The bag is closed after most of the air has been let out and then

gently the fiber is swished around in the bag to ensure it is completely wetted with the dye solution. The bag is then left to sit for several hours or overnight to allow all the dye color to be exhausted which is another way of saying "absorbed" by the fiber.

Natural Dyeing

An interesting and fun project for a club is natural dyeing, especially if the youth gather the plants or flowers themselves. This project can be as extensive as starting the dye plants as a club activity in the spring, gathering nettles or goldenrod on the farm, or simply buying the dye plantstuff from a shop. All the yarn pictured to the right was dyed naturally, and all but the blue yarn was from plants gathered from an Ohio farm in late summer. There is ample information and many videos on the internet to learn about the process, but it isn't at all complicated.

The alpaca fiber or yarn is soaked for half an hour in a mordant such as alum (which can be purchased at a grocery). The yarn can either be dried for later use or immersed in the dye bath immediately.

Walnuts, a jar of dye, and a skein of dyed yarn.

Plant stuff for dyeing is either gathered or purchased and immersed in water in a large pot and brought up to a simmer. It can be helpful to have a mesh bag to enclose the plant material as though it were a giant tea bag. Or after simmering mesh can be used to strain the liquid, but this requires a second large pot. The plant material must be removed from the dye bath before immersing the fiber, so it doesn't get mixed in with the fiber.

Chemical Dyeing

Kool-aid, food coloring, and Easter egg dyes are all chemical dyes, but there are also dyes that can be purchased in liquid form such as Rit dyes, or as powders. These are specialty items and can be found in stores selling handcraft items or from the Internet.

One company, called Greener Shades, has non-toxic dyes that are safe to use and very effective. They sell less than ten colors that are mixed to create the entire spectrum.

Dye Methods: There are some important things to keep in mind:

- Whether you are applying dye onto fiber in a tray or placing it in a pot of dye solution, you should always pre-wet your fiber or yarn to ensure even dyeing.
- Latex gloves can be pretty "handy."
- Hot plates with an extension cord allow you to take the process outside.
- Even though dyes are non-toxic, or even edible, it is good practice to keep your dye tools and pans separate from those you use to cook in.
- Not all water is created equal. Some water

can have high concentrations of various minerals that could interfere with how well your fiber dyes. If this is an issue, rainwater is a great source of dye water, or you can purchase bottled water.

- Animal fibers accept dye best when the dyebath has a pH below between five and six—slightly acidic. You can purchase pH strips to find out if you have added enough vinegar to the dyebath.
- Ventilation during dyeing is important especially if you are using chemical dyes.
- The optimum temperature is between 170 and 180 degrees. A nice simmer.
- ***DO NOT BOIL*** your yarn or fiber for it will felt and/or have a harsher feel. If you want to move the fiber to assure even dyeing, be gentle to prevent felting.
- To ensure that all the dye that can be absorbed has its chance, you can bring the dyebath to a simmer and then turn off the heat and allow the pot and fiber to cool for several hours or overnight.
- Always rinse your fiber or yarn completely when you are finished dyeing.

There are several different dye methods you can try:

- **Immersion Dyeing:** This uses a pot of dyebath that you immerse the fiber in. If you want to do something a bit different, you can immerse only half of a skein of yarn, or put 1/3 in first, wait a few minutes, then slide the next 1/3 in, and then after a few minutes place the whole skein in. This will produce variegated yarn. Be careful because sometimes the skein can wick water out of the pot and onto the stove.
- **Tie Dye:** Restrict how much dye can reach the yarn by placing wide rubber bands around the skein.
- **Tray dyeing:** Skeins or fiber can be placed in aluminum roasting pans. Different dye colors can be applied to the same skein by squirting dye onto the yarn, or dye powder can be lightly sprinkled on the well wetted fiber for a speckled effect. The tray is then put in the oven at the lowest setting for at least half an hour to set the dye. Be certain the temperatures don't go over 180 degrees.
- **Microwave Dyeing:** Dampened and dye painted yarn are placed in roasting bags and then microwaved.

The Fiber Arts

Now that the fiber has been dyed, it is time to think about what to do with it! There is enough to do with alpaca fiber to keep someone busy for a lifetime. Great things can be done with alpaca fiber! There are thousands of videos available online for you to take advantage of, from novice level to professional. They can be a great source of both instruction and inspiration.

Felting

This craft has become very popular in the last several years, but it is probably the oldest of the fiber arts. There are two types of felting- wet felting and needle felting.

- **Wet Felting:** As you may remember from the previous chapter, alpaca fiber (as well as other animal fibers) have scales on the outside of the individual hairs. When the fiber is wet, the scales stick out more, and hot water will make them stick out even further. If you add agitation and a little soap, the fibers tangle and lock together

due to the scales. Wet felting techniques can be used to make something as small as little ornament balls for a necklace or earrings or the walls of a home known as a yurt (pictured above).

- **Needle Felting:** The first patent for a needle felting machine was issued in 1859. The current needle felting machines have hundreds of needles locked into a plate that moves up and down over a carded batt. The needles catch and tangle the fibers in the bat as the plate moves up and down. With each pass through the machine, the batt becomes more and more compressed into a sheet.

We use the same needles to do needle felting. They are only about three inches long and along the shaft of the pointy end there are small barbs that grab the fiber as you plunge it into the fiber but release it as you pull the needle out. Doing this repeatedly, and using different colors of yarn, you can create sculptures or felt "paintings" with intricate detail.

Hand dyed and felted alpaca fiber

Knitting

This fiber art needs no introduction. Using a pair of needles, yarn is converted into wonderful items to wear and use. It is easier to learn on larger needles than on smaller ones. Size 7 to 9 needles are perfect. It is also easier to learn on yarn that is thicker. Worsted weight, or "medium" yarn is great to start with.

Leaders might want to cast on for the club members first, and then teach casting on at a later time when they are more comfortable with using the needles and yarn. It might be best to start out with a smaller project. A small knitted and then seamed rectangle can become a fingerless glove. There is a poem to help remind child and adult what the steps for knitting are:

- Cross under the fence (put your right needle through the stitch so your left needle and make an "X" with the tips on the other side).
- Catch your sheep (wrap the yarn around the right needle).
- Come back through (take the wrapped yarn back through the same hole you went in).
- Off we leap (stitch slips off the left needle)

Knitting Loom

These are a great and easy way to introduce young people to knitting without the difficulties of handling two needles. These looms are inexpensive and readily available at the large craft stores. Using these, children can quickly make hats and scarves. Different sized looms create different sized hats and scarves.

Crochet

The beauty of crochet is that you only need one crochet hook and there is no risk of having a

Weaving

project slip off the needles. This makes it very "kid friendly." Unfortunately, hooks sizes are described differently in the United States, Great Britain, and elsewhere. From 2mm or a U.S. 0, to 25mm or U.S. T/U/X. A U.S. size G or H with a worsted or medium weight yarn is great to start with. As with knitting, it is best to start with a smaller project to prevent frustration and boredom.

Punch Needle

This fiber art is far less known than crochet and knitting. It uses a special tool that carries yarn through the fabric. The tension of the fabric grips the yarn to keep it in place forming a loop. The length of the loop left in the fabric can be changed to add texture to the piece. The project could be a coaster or trivet, a purse, a decorative wall piece, or a rug. The design can be sketched onto the fabric on the "wrong" side, for the needle punch enters the wrong side and leaves the loop on the opposite side.

What you need:

- Punch needle: Not all of these are created equally. Some are designed to allow different lengths of loop, while with others you need several different punches to get different length loops.
- Fabric to punch into: Not any fabric will do because the weave needs to be of strong fiber and have some space between threads to allow the needle and yarn to pass. This is referred to as open weave. Monks cloth, linen, and rug warp are optimal. Burlap is another cheaper alternative. Monks cloth is the softest and most used, but linen can be pretty if only part of the cloth is to be punched.
- A frame or hoop: the fabric can either be stretched in an embroiderer's hoop or on a frame to keep the fabric taught to accept the needle and yarn. You may want to use a circular frame to hold the fabric and become a permanent frame for your project.
- Alpaca yarn.
- Scissors
- Masking tape or a "no fray" liquid to prevent the fabric from fraying at the edges.
- Glue: this is optional, but spreading a layer of glue on the wrong side of your piece can help ensure that the loops stay firmly in place.

Embroidery and Cross Stich

Because embroidery and cross stich use smaller diameter thread or yarn, alpaca isn't used very often, but lace weight yarn could be used to embroider designs onto clothing or onto fabric to create a decorative piece.

Weaving

This requires the use of some kind of loom. A great starter loom is the peg loom where pegs are placed at opposite ends of a rectangular frame. The warp threads are strung on these pegs and the weft is woven across it.

Do not confuse a peg loom with a knitting loom. They can look similar, but they are very different. The inkle loom is popular for making straps and belts. The triangle loom has become quite popular as well, but they are not cheap! The rigid heddle loom is next in expense, but certainly worth the investment if someone is truly interested in weaving.

Once again, guilds are an excellent resource for finding instructors and expert advice, so be sure to take full advantage of them. Additionally, there are thousands of weaving tutorials available online, showcasing various looms and techniques to help expand your skills.

What You Should Know

- **Understand the following processes:**
  - **Skirting**
  - **Washing**
  - **Picking**
  - **Combing**
  - **Carding**
  - **Spinning**
  - **Plying**
- **Alpaca can be blended with many other fibers before being made into product.**
- **Alpaca can be dyed into different colors using several different methods.**
- **Alpaca can be made into wonderful items by:**
  - **felting**
  - **weaving**
  - **knitting**
  - **crochet**
  - **embroidery**
  - **punch needle**

CHAPTER 16

Training an Alpaca

Introduction

As you begin working with alpacas, you will find that they are very intelligent and learn quickly. Most alpacas would rather be with other alpacas instead of humans. They would rather graze in the pasture than walk into a building or have someone pet it. Most training is simply convincing an alpaca that human contact is not something to fear. The trainer is always trying to earn and keep their trust.

Today there are multiple resources online and in print to assist you. There are many different methods to choose from and you may find that one method works better for one alpaca than another. The Alpaca Owners Association has a page with links to many videos

Training can begin the day a cria is born or several years later. It is important to understand that alpacas have personalities just as humans do. Some alpacas are friendly and some are fearful, some are willing to be touched and be handled, and others will do everything they can to get away.

The Beginning

Different approaches and techniques may work differently depending on the age of the alpaca and its personality.

The Cria: The best time to start working with an alpaca is the moment it is born. This is a natural opportunity because we want to check to be certain all is well with this new arrival. Simply drying off the alpaca with a towel while its mother watches is a great introduction. At the same time, you can check whether it is a boy or girl and dip the navel in iodine. Touch the cria all over from muzzle to tail on both sides of the body to start the desensitization process on day one.

Touching the alpaca in this way two times per day is worthwhile and although you would never halter train on the first day, it is a good idea as early as day one to slide a halter onto the cria's face to help it accept that as a normal part of life. After a week of touching the cria twice a day, you can reduce the entire practice to daily, and then after a few weeks, just every two or three days.

Sometimes a mother's instincts will make it upset with you, but she should always be nearby. You should be very quick about this touch training and do it in a business-like fashion, especially if the cria is a male, to avoid creating a male that is aggressive to humans when it gets older, because they think we are alpaca rivals. This is not a time to coo over and hug the alpaca.

There is a condition with male camelids that is called **berserk male syndrome**. In this case, the male grows up thinking that human beings are alpacas. When the male reaches maturity, it then looks at people as being rival males and tries to attack them as he would another female.

Because of this, contact with male crias and yearlings should be kept "professional." Cuddling with them and cooing over them is not a good idea. Certainly accustom all alpacas to being handled, but do not overhandle young males.

The Older Cria: A cria can begin halter training at four or five months. At this age, usually a cria can be managed by an eight year old child, but always with some adult supervision.

Remember that alpacas are herd animals and like to be with their herd mates and/or mother. Halter training can be much easier if the mother is halter trained and the cria's introduction to the process is done with its mother in halter beside it. If the mother is not halter trained, another trained alpaca buddy can be substituted. The point is to avoid stressing the cria by taking it away from its mother and herd all by itself. Training can also be done with less stress if it happens in the pasture with the rest of the herd nearby. Always remember that you are trying to instill trust, minimize stress, and keep things positive.

Some will use food to train an alpaca, but this only works if the cria is accustomed to eating alpaca supplements. Some will place the cria in a halter with a long lead and gently pull the cria to them. Some trainers will simply use a regular lead. Often the trainer will take advantage of the entire lead length to appear less threatening to the cria as they encourage it to move toward them.

NEVER WRAP THE LEAD AROUND YOUR HAND OR ARM

The young man pictured above is holding the lead gathered properly in his left hand while his right hand is placed correctly on the lead, a few inches from the clasp where it attaches to the halter

The Adult Alpaca: An alpaca that has not been halter trained is much more of a challenge and different techniques may have better results than others. Training becomes a longer process of gaining trust and getting the alpaca accustomed to being with you. Initial training could begin with bringing the alpaca into a pen with a few other alpacas for some feed. While the alpaca is eating, you could gently touch the alpaca several times being careful not to be positioned behind the alpaca to avoid it kicking you reflexively.

After doing this over several days, you can add placing a halter on the alpaca and reward it with some feed from your hand. Then after a few days of haltering, you can introduce the feel of a lead rope. Ultimately, you will want to lead the alpaca out of the pen with a halter and lead rope.

Alpacas are led with the lead held in the right hand, the extra length of lead held in the left hand and the alpaca on the right side of the handler. To turn around and change direction, it is customary to turn into the alpaca. This is called a haunch turn, for the alpaca is pivoting on its haunches or back legs as opposed to being pulled along by the handler.

To Geld or Not to Geld: We discussed berserk male syndrome earlier and gelding can sometimes be effective at controlling those impulses a male might have, but it is not a guarantee. You certainly do not want to geld a male that you want to use for breeding, but gelding will help keep a male from getting overly distracted by females at an alpaca show. In other livestock males are gelded soon after birth, but the preferred time for gelding is when a male is at least a year old, if not 2. This is to allow good bone growth which is affected by the testosterone produced by the testicles.

Gelded males are only permitted to show in AOA Performance classes, but their fleeces can be shown in fleece competitions. For the younger exhibitor, it might be wise for them to handle gelded males in the Performance ring or on the farm in case the intact male gets “distracted” by some pretty little thing in the next pasture.

The Space: When placing pastures, fencing, and buildings at your alpaca’s home, hopefully consideration was made for being able to herd the alpacas into a space that makes haltering and training easy. Many alpaca herdsmen have what is called a catch pen that is a space that allows you to have closer contact with the alpacas. Many will use this space for feeding their alpacas so that they are accustomed to coming into it and are rewarded when they do.

For training, a round pen is a popular space. Five to ten foot panels can be joined to form a circular space without corners. In such a space over several days, you can slowly elevate your contact with the untrained alpaca- first by simply being with it in the pen, then encouraging it to move, then hand feeding, then touching, then showing it the halter, then haltering. The round pen panels can stay up, or taken down and easily reconstructed later (this space can also be useful for breeding).

Do not start training on concrete or hard surfaces: Sometimes alpacas will get very jumpy, do dramatic contortions of their bodies, and even fall! You do not want them (or you) to land on concrete or hard ground. Initial training is safer and easier in the pasture, and it is less stressful for the alpaca to be where it usually spends its time.

When you have reached the point that the alpaca is reasonably comfortable with halter and lead, you can leave the restrictions of the round pen and begin walking elsewhere. Down a driveway or around buildings to areas that are new is a great way to build the alpaca's trust in you that you are not leading it into danger. Remember to introduce your alpaca to the trailer or car in case it needs to be transported someplace. The more varied the experiences, the calmer and more trusting your alpaca will become.

NEVER HIT AN ALPACA OR JERK ITS LEAD!

Some youth have been known to take their alpacas into the house for a walk around, even going up carpeted stairs!

The Training: The focus of training is on building trust and eliminating fearfulness for both the handler and the alpaca. But being trained to the halter and leading easily is also useful if you need to take your alpaca somewhere such as breeding, evacuation, or to the veterinarian. Optimally, all alpacas should be halter trained unless they are part of a large fiber herd where they will never leave the farm/ranch.

- **Halter Fit:** A very common cause for an animal not acting correctly is the halter is not in proper position or not sized correctly. This allows the halter to slip down toward the nasal passages where the cartilage is soft and the passages close off. See the photos at the bottom of the previous page.

  Alpacas breathe only through their nostrils, so this causes them to panic. The halter needs to be fastened so that the band over the muzzle is close enough to the eyes that it sits on the bones of the muzzle and will not shut off the airway. If it is also snug behind the ears, it can't slip forward. This is a more common issue with alpacas under 1 year old because their muzzles are shorter. See photos at the bottom of the previous page.

  The fiber that alpacas have around their head can give you the impression that the halter is fitting snuggly even though it is not. Tension placed on the halter can then compress that fiber and allow the halter to slip forward.

In the above photo, the halter is resting on the bones above the nasal passages. The space above the nostrils is covered with soft cartilage which can obstruct the nasal passages if the halter slips down, thus causing the alpaca to panic. Pictured right is proper halter fit, but poor hand placement that is too close to the clasp.

NEVER TURN AN ALPACA OUT INTO THE PASTURE WITH ITS HALTER ON

- **Hand Placement on the Lead:** At every show, at least one alpaca is set free because the handler accidentally

opened the clasp of the lead rope. This occurs because they have placed their hand to high, up on the clasp. Your right hand should be placed at least 6 to 8 inches from where the lead rope clasp is attached to the halter. The remaining lead should be gathered neatly in your left hand, never wrapped around your hand. See the photos on the previous page. Good hand placement is demonstrated in the top photo and poor hand placement is shown bottom right. An excellent relationship between the handler and their alpaca is demonstrated when the lead rope has some slack in it as they move around.

- **Take and Give:** When you start to halter train, you will be placing tension on the lead rope to encourage the alpaca to move forward. Its initial reaction is to pull back, but you must not allow it to, you need to maintain that tension, BUT the moment the alpaca moves forward, you reward it by letting the lead go slack. Wait a few seconds and do it again- tension on the lead to move forward and then immediate slack when it does. It sounds too easy, but it works wonders.
- **Short and Sweet:** As you begin training, both you and the alpaca are stressed. Keep the sessions shorter until you both are more comfortable. This will keep both of you from getting frustrated. If things just aren't going well today, stop and try it again the next time you are able. When schedules allow, it is better to work with an alpaca for 15 minutes 4 times a week, than for 1 hour once a week.
- **Alpaca Feed Rewards:** Sometimes the way to get any animal to cooperate is through its stomach, and alpacas are no exception. Providing food as an incentive

is a great way to build trust between handler and alpaca. Having some alpaca feed in a pocket or pouch to entice or reward your alpaca with is a great way to gain cooperation.

- **Building On Trust:** Some may halter train simply to compete in halter classes, but most youth train to compete in Performance shows where the team competes in Showmanship, Obstacle, and Public Relations competitions.

  To prepare for these, introducing your alpaca to different experiences while on halter and lead is beneficial. Once trained to the halter and lead, take your alpaca all around the farm to expose it to different items. The more unusual and different experiences it has with you, the more it will trust you when it comes time to face those challenges in competitions.

- **Positive Training ONLY:** It has been said here many times that training and trust go hand in hand. Jerking on a lead, hitting an alpaca, or asking an alpaca to do things when it is already stressed and overwhelmed is not positive training. These things are negative and set training back by eliminating trust. If your alpaca is acting overwhelmed, then stop the training. Perhaps provide a treat as a positive ending to your training together to end things on a good note.

  Accept that just like us, alpacas have good days and bad days. Sometimes alpacas will breeze through training and other days they can be very stubborn. As frustrating as that can be when you have worked so hard, it is simply a fact we have to accept.

- **TRY not to be nervous:** Some say that if the handler is nervous, that nervousness will travel right down their arm and hand to the lead rope and over to the alpaca making it nervous. It is true that alpacas will respond to the energy you project. If you are calm and collected, they are more likely to be calm and collected. If you are nervous, they are more likely to be nervous. It has been suggested that peppermint is calming for both the handler and the alpaca. Slow deep breaths and trying to relax your shoulders, neck and body will also help.

- **Trailer training:** Once you and your alpaca are confident moving around with halter and lead, it is very helpful to train your alpaca to get on and off the trailer if you have one available.

What If?

Some alpacas are not good on halter and lead, and seemingly never will be. Rarely there are alpacas that are so difficult to train that you simply have to accept that success will take a large time commitment. These alpacas are best trained by an older child or an adult. These difficulties usually occurs because the alpaca is extremely fearful, possibley from some past experience. In the natural environment they are prey animals and they often view us as predators. A decision will have to be made whether there is enough time and energy to work through this situation. There are multiple training videos on the AOA website that may be useful.

The Ultimate Goal

The perfect alpaca/handler team is one where the alpaca will walk beside you without a halter and lead. In a competition, as the team moves through the ring or course, the lead between

handler and alpaca should be slack or shaped like a "U." The handler should always lead with the alpaca on their right and both of their eyes should be even with each other, so they are walking side by side. The more you work with your alpaca, the closer you can get to that Ultimate Goal!

Additional Resources

- Alpaca Owners Association (AOA) has several instructional videos on their website.
- AOA has several resources on their website about the different competitions youth may participate in.
- For detailed information on competing in AOA Performance competitions, you can access the AOA Show System Handbook as a PDF or purchase a copy on the website.
- John Mallon is a world renown animal trainer who has worked with multiple species including alpacas. He has written several books and has several videos on YouTube. There are also others who have trained in the Mallon method and help with training.
- Marty McGee Bennet is a very well known alpaca and llama trainer here in the United States. She uses a method called T Team and has videos and books that she calls CAMELIDynamics.

What You Should Know

- **Just like humans, alpacas have different personalities.**
- **The earlier in an alpaca's life you start training, the better. Alpacas often train more easily if they have a trained alpaca with them as you work.**
- **Be familiar with what a berserk male is.**
- **Know how to properly halter an alpaca.**
- **Know how to ensure the halter fits properly.**
- **Know how to hold the alpaca lead.**
- **Know how to position yourself to the alpaca.**
- **Know what a haunch turn is.**

CHAPTER 17

The Camelid Medicine Cabinet by Pamela Walker DVM

Dr. Pamela Walker is a 1992 graduate of Kansas State University College of Veterinary Medicine. After two years in private practice as a dairy practitioner, she went to the University of Illinois to complete a Food Animal Medicine and Surgery residency, where she also received her Masters of Science degree. During this time, she finished her boards in the American College of Veterinary Internal Medicine, specializing in Large Animals. She has taught senior veterinary students at University of Illinois, Washington State University, Michigan State University, and Ohio State. Dr. Walker worked for many years at a large alpaca farm in northern Ohio managing breeding, birthing, and all veterinary care of the alpacas there. She speaks world-wide about Camelid medicine, has travelled numerous times to South America to assist with Camelid research and has recently co-authored the 4th edition of the ***Medicine and Surgery of Camelids.*** *Dr. Walker now practices at her clinic in Grove City, Ohio and can be reached at 419-306- 9522 or pamwalker@hotmail.com*

The camelid population is continuing to grow in the United States increasing the need for current, scientifically based information about proper dosing of medications in camelids. There is ongoing research in many institutions to try to find answers for these questions. The lack of complete information represents a challenge for veterinarians and camelid owners when determining a course of treatment for their camelid patients. As camelid owners it is important to work with your local veterinarian to plan treatment protocols for your llamas and alpacas. There are many factors to take into consideration when determining which drugs and what dosage to use in different situations. The information provided here is a basic guideline; **specific treatments should be started only with the guidance of your veterinarian.**

Due to the expense of scientific research, there is a lack of complete information for treating alpacas/llamas, so the dosages used in camelids are frequently taken from dosages used in sheep, goats, cattle and horses. However, several differences between camelids and other livestock have already been discovered. For example, antibiotics, as a general rule, appear to have a longer time of action in camelids compared to domestic ruminants. There also seems to be a difference in dosing between llamas and alpacas. These differences can be dangerous and result in fatal over-dosages if the drug mechanism is not understood, for example Panacur and Valbazen doses. The choice of which drug to use in certain situations is a complicated decision and should not be decided upon in a “cookie cutter” manner. The age, sex, pregnancy status and general health of the alpaca/llama should be taken into consideration when deciding which drug to use. The following information is on drugs commonly used in alpacas and llamas.

Abbreviations Used in this Document:

PO: orally or given by mouth

SID: given once per day

BID: given twice per day

TID: given three times per day

QID: given four times per day

EOD: given every other day

ETD: given every third day

SC or SQ: subcutaneous, injected just under the skin

IM: intramuscular, injected in the muscle

IV: intravenous, injected directly into a vein

mg: milligram, a measure of weight

cc: cubic centimeter, a measure for liquids

mL: milliliter, the same as a cc, a measure for liquids

IU: international unit (a measure of medication)

How to calculate how many mL (same as cc) to administer:

Example: Animal's weight: 100 lbs
Drug concentration: 50 mg/mL
Dose of drug: 2 mg/lb

First: determine how much total drug is needed for one dose: **Animals weight X dose of drug**

100 lb. X 2mg. per lb. = 200 mg of drug needed

Second: determine how much to give based on mg needed and strength of drug: **Total drug X Condentration of drug**

200 mg ÷ 50 mg/mL = 4 mL of drug to administer

ANTIBIOTICS

Aminoglycosides: Gentamicin (100 mg/mL), Amikacin (50 & 250 mg/mL) should only be used with extreme caution as they can cause death due to kidney failure if given for prolonged periods (>5 days in a row) by IV, IM or SC route. Kidney function should be monitored closely, and the animal should only be given this drug class while supplemented with IV fluids. They can be used as part of an intrauterine lavage without risk of toxicity. **Amikacin** – is considered to be the safer of the two drugs in other species. Regardless of form used, a maximum 5 day, once daily dosing is recommended.

- **Dose: 2 – 3 mg/lb, SC, IV, SID, for 5 days ONLY**

Baytril 100 (Enrofloxacin 100 mg/mL): commonly used to treat neonatal sepsis, upper respiratory infection, pneumonia, and uterine infections in camelids. It is labeled for treatment of respiratory disease in beef cattle. It is considered to be a "big gun" and should not be used as a first-choice antibiotic. In puppies (< 8 months), use of this drug is associated with cartilage damage in joints; it is unknown if the same is true for camelid crias. Use of this drug in cats has been associated with blindness with high doses and long-term use; the same has been reported in a Guanaco after 26 days of therapy. Research has looked at oral absorption of this drug in camelids using double the injectable dose. There is absorption at 4.5 mg/lb, PO, SID but it is still preferred to give Baytril either SC or IV. It is considered to be a broad-spectrum antibiotic, but does not work against *Streptococci, Enterococci, Actinomyces, Pseudomonas* bacteria or anaerobic infections.

- **Dose: 2.3 mg/lb, SC, IV, SID to BID (IV route) (0.6 mL/25 lbs, 2.3 mL/100 lbs)**

Biomycin 200, LA 200, Noromycin 300, Duramycin 300 (Oxytetracycline): used mainly for the treatment of *Mycoplasma haemolamae* ("Epe") in camelids. It is a very irritating drug and should not be used IM. SC placement needs to be done carefully, alternating injection sites and thoroughly rubbing flat the drug under the skin (best done over the rib area). The brands **Biomycin 200, Noromycin 300 or Duramycin 300** are much less irritating and are the **preferred** products **(do not use LA200)**. It is labeled for every other day use in cattle, but the researcher at Oregon State University recommends it be given every three days (ETD) for five treatments. In some cases of *M. haemolamae* it may take more than five treatments if the animal remains anemic. If it is used IV, it must be given SID. I recommend for follow up to IV treatment, three treatments SC, three days apart. I recommend three treatments SC, three days apart, as follow up for IV treatment.

- Dose:
  - **Biomycin 200, Noromycin 200 – 9 mg/lb, SC, ETD for five treatments (4.5 mL/100 lbs)**
  - **Noromycin 300, Duramycin 300 – 9 mg/lb, SC, ETD for five treatments (3.0 mL/100 lbs)**

Draxxin (Tulathromycin – 100 mg/mL or 25 mg/mL): labeled for treating respiratory disease in many species. It is also considered a "big gun" as it is a newer antibiotic on the market. With this in mind, it should only be used when other, more commonly used antibiotics have failed. It can be used with tooth root infections for 6 – 9 total injections (given weekly) in combination with Isoniazid. It is more expensive than other choices, but has long duration of activity in other species, (undetermined in camelids). The dose used is the same as in other species.

- **Dose: 1.1 mg/lb, SC, can be repeated in 7 days if no improvement. (1.1 mL/100 lbs) if 100 mg/mL concentration used OR 4.4 mL/100 lbs if use the 25 mg/mL concentration)**

Nuflor (Florfenicol – 300 mg/mL): commonly used to treat upper respiratory infection, pneumonia, and tooth root infections in camelids. It is a broad-spectrum antibiotic that is labeled to treat respiratory infections in cattle and is given every other day (EOD). Based on information from a study done on alpacas at Ohio State University, the best regimen is daily dosing IM. Due to how the drug is metabolized (by the liver), it should not be given to young crias (less than three months old). Contraindicated to use with any other antibiotics. Can occasionally cause them to lose their appetite. Studies are to be conducted at Ohio State to look at proper dosing in llamas.

- **Dose: 9 mg/lb, IM or SC, SID (1 mL/35 lbs, 3 mL/100 lbs)**

Penicillins: Considered to be a very safe class of drugs that can be used at very high dosages if needed.

- **Ampicillin:** comes as a SC form (Polyflex) and an IV form (Ampicillin sodium). Considered reasonably safe in most species. The IV form has a short duration in the blood and must be dosed several times a day.
  - **Dose: Polyflex: 10 mg/lb, SC, BID**
  - **Dose: Ampicillin sodium: 5 mg/lb, IV, TID to QID for Listeriosis**
- **Excede (Ceftiofur Crystalline Free Acid** – 200 mg/mL**):** a product labeled for respiratory infection in cattle and swine. It is intended to be administered as a one-time treatment SC at the base of the ear in cattle and IM at the base of the ear in swine. Due to this unique

location of delivery of the drug, and the unique physiology of camelids, absorption may be unpredictable, and no research has been done in camelids. Regardless of this, Excede has been used by many veterinarians in camelids with apparent success. When administered, it is important to confirm the needle is not in a vein (pull back on plunger to check for blood) as this drug will kill instantly if given IV. Excede is probably best reserved for use in animals that cannot be given injections every day. If needed, an additional dose can be repeated on day 4 if your veterinarian has determined it is is important to confirm the needle is not in a vein (pull back on plunger to check for blood) as this drug will kill instantly if given IV. Excede is probably best reserved to for use in animals that cannot be given injections every day. If needed, an additional dose can be repeated on day 4 if your veterinarian has determined it is appropriate.

- **Dose: 3 mg/lb, SC, can repeated on Day 4 (1.5 mL/100 lbs)**

- **Naxcel, Excenel (Ceftiofur – 50 mg/mL)** – commonly used to treat neonatal sepsis, upper respiratory infection, pneumonia, retained placenta and uterine infections. Naxcel can be used IV or SC. If used IV, it must be given BID. With severe infections and SC usage, it can also be used BID. Excenel has the same parent drug as Naxcel, just a different carrier that allows it to be kept at room temperature, with a longer expiration date; it should only be given SC, never IV.
  - **Dose: 2 mg/lb, SC, IV, SID to BID (1.0 mL/25 lbs, 4 mL/100 lbs)**
- **Procaine Penicillin G (300,000 IU/mL)** – This is the BEST concentration for use (do not use the Benzathine form). Commonly used to treat tooth root infections, skin infections/wounds, infected foot pads, umbilical infections and follow up treatment for Listeriosis (bacterial infection in the brain). Best choice to use if Clostridium infection is suspected. Not a good choice for Upper Respiratory Infection or Pneumonia. Anaphylactic shock (respiratory failure and collapse) can occur on occasion and must be treated immediately with Epinephrine (1 mL/100 lbs, IM) to prevent death. If this happens, do not use this drug again in that animal.
  - **Dose: 10,000 IU/lb, SC, BID (0.8 mL/ 25 lbs, 3.5 mL/100 lbs) OR**
  - **Dose: 20,000 IU/lb, SC, SID (1.6 mL/25 lbs, 7 mL/100 lbs)**

Sulfa drugs – The **ONLY** use for Sulfa drugs in camelids is for the treatment of intestinal coccidia. The use of Sulfa drugs must be used with caution as a potentially fatal complication called Polioencephalomalacia can occur. Polioencephalomalacia is a condition where there is a sudden lack of Vitamin B1 in the first compartment (C1) of the stomach and causes subsequent softening of the brain. This results in neurologic signs – most notably blindness. Normally this condition can be treated by administering Thiamine (Vitamin B1), but when the condition is caused by Sulfa drugs, it is non-thiamine responsive and is usually fatal.

- **Albon (Sulfadimethoxine)** – comes in different concentrations and this which will determine the amount to be given. (See above how to calculate dosages located at the beginning of this document) calculation for example.
- **Dose: Day 1: 25 mg/lb, PO, SID . Day**

2-5: 13 mg/lb, PO, SID

- **SMZ, TMS, TMP (Trimethoprim-sulfamethoxaole)** – is NOT effective orally in adults and ruminating crias (> 30-45 days), this has been proven conclusively by two scientific studies.
  - **Dose: 13 mg/lb, PO, BID (Dose base on the Sulfamethoxaole portion)**

Anti-inflammatory, Analgesics (pain management)

Banamine (Flunixin meglumine – 50 mg/mL) : this is a non-steroidal anti-inflammatory drug used to treat pain, inflammation and endotoxemia (toxins in the blood from bacterial infections). It does not have properties to directly cause calmness, except as what would be expected from the relief of pain. If used for long term, it may lead to ulcers in the third compartment of the stomach (true stomach). It should also be used with caution in dehydrated camelids as it can damage the kidneys. In dehydrated animals, use one-half dose until the animal is fully hydrated. Depending on the reason it is being used, once a day seems to be clinically adequate. If the animal becomes painful again after 12 hours, an additional dose can be given for short term use. To avoid severe side effects, it is best if the animal is fully hydrated (possibly on IV fluids). It is not effective if used orally. Other ruminants need a very high dose orally for pain relief, and even then not it is not very effective. Use Meloxicam (see below) for oral pain relief.

- **Dose: 0.23 mg/lb – 0.5 mg/lb, IV, IM, SC, SID to BID (0.5 – 1 mL/100 lbs)**

Etogesic (**Etodolac** – 300 mg tablets): this is an oral non-steroidal anti-inflammatory drug primarily used to treat bone pain. It is used mainly in dogs. I have used it after repairing a bone injury if the animal is still painful and having a hard time getting around. It can be used if there is a non-specific lameness, once it has been determined by X-rays that there is not a repairable injury present. As we do not know if it causes ulcers, I recommend using it SID for 7 days, then EOD for another two to three weeks if needed. If the pain seems controlled on EOD, then reduce to two times a week. Meloxicam

has replaced drug.

- **Dose: 4.5 mg/lb, PO, SID for 7 days, then decrease to EOD**

Ketoprofen (Ketofen) – this is a non-steroidal anti-inflammatory drug used mainly in horses and dogs. Minimal research has been done on camelids and it is used very little clinically. It has a very short duration of action. As there are other, effective anti-inflammatory drugs available (Meloxicam), it probably is not a good choice to use unless your veterinarian has experience with the drug.

- **Dose: 0.9 mg/lb, IV, IM, SC**

Meloxicam (7.5 & 15 mg tablets) – a drug used in small animals and horses for pain management. Recent research in llamas has provided data to indicate its usefulness in camelids. Many veterinarians have been using it in the field based on experience with other animals. The data indicates the drug stays in the blood for three days. More studies will have to be done to confirm if pain control will last that long. I recommend a "loading dose" of daily for three days, then EOD if pain control is still effective at EOD.

- **Dose: 0.5 mg/lb, PO, q 2 days**
  Can be used daily if indicated

Phenylbutazone "Bute" – based on research, probably not useful in camelids

Anti-Ulcer Medications (in order of importance)

Protonix (Pantoprazole) – human drug that has been studied in alpacas that blocks the cells that produce acid in the third compartment (true stomach). This makes the pH higher and helps ulcerative tissue heal. Can be given IV or SC and the action of the drug will last for 24 hours. It comes in 40 mg vials that must be rehydrated with sterile saline before use. **Due to the known effectiveness and only once a day dosing it is a good choice to use if gastric ulcers are suspected.** Over the last few years, the cost of this drug has come down and is more reasonable. Once a vial is mixed, it is stable for 96 hours (keep refrigerated, researcher comment).

- **Dose: 0.5- 1.0 mg/lb, IV or SC every 24 hours**

Carafate® (Sucralfate – 1 gram tablets) – a drug that works in an acid environment to bind to ulcerated tissue in the third compartment. Can be given BID to QID. If it is used in combination with Cimetidine, the Carafate must be given one to two hours BEFORE the Cimetidine. The clinical impression is that it "seems to help." Useful in stressed crias at shows and at weaning.

- **Dose: 1 gram/50 lbs, PO, BID to QID**

Cimetidine HCl injection – blocks the cells that produce acid in the third compartment (true stomach) and makes the pH higher which helps ulcerative tissue heal. Can be given IV or SC. Must be given one to two hours AFTER Carafate is administered. It has a short duration of action and can be given BID to QID. May need to be specially mixed by a pharmacist due to limited availability. Not a good choice for treatment of ulcers. Protonix has replaced this drug.

- ***Dose: 4.5 mg/lb, IV, SC (1.5 mL/ 50 lbs)***

Gastroguard (Omeprazole) – DOES NOT WORK orally in camelids that are old enough to chew their cuds!! For young crias, can use 1 to 2 clicks, twice a day. It is effective if given IV, however it is not available commercially in that form and your veterinarian would have to have it specially mixed by a pharmacist compounded.

- **Dose: 0.2 – 0.4 mg/lb, IV, QID**

Anti-parasite Drugs

(Antihelminthics)

Antiprotozoal: products used in camelids to treat protozoal parasites such as *Coccidia, Cryptosporidium spp, Giardia, Balantidium coli.*

Baycox® (Toltrazuril 50 mg/mL), the parent drug to Ponazuril, not approved for use in the United States has been used for several years by camelid owners for the treatment of E.mac. Information provided to the author by Bayer demonstrated good absorption in cattle with only one dose. Suggesting this drug, made for piglets, would also work to treat E.mac.

Dose: 9 mg/lb (1.8 mL/10 lb), PO, once

Corid (Amprolium): used as individual and group medication for treatment and prevention of coccidia in camelids. Keep in mind that it is normal to find some regular coccidia in adult feces. Only treat adults if they are having clinical disease (severe diarrhea) to regular coccidia. Over-dosage and prolonged use of this drug can also induce Polioencephalomalacia, however this form is Thiamine responsive. When treating a group, must be the only source of water available. Is not a suitable treatment in the water for young crias, as they do not drink enough water to medicate themselves. Follow label directions, do not keep adding drug to remaining water, for you will change the concentration of the drug and therefor the dosage. Pour out remaining water and mix fresh daily. As a general rule this form of medication is not very often recommended.

- **Mix Ratios:**
  - **1 oz/5 gallon water**
  - **4 oz/25 gallon water**
  - **8 oz/50 gallon water**
- **Individual dosing (using the 9.6 percent concentrate): add 1.5 oz of drug concentrate to 4 oz of water, give 7.5 mL/100 lbs of the mixture. Can add flavoring. It should be made up it fresh every day, give daily for 5 days**

Humatin (Paromomycin Sulfate – 250 mg capsules) – used to treat Cryptosporidium diarrhea in young crias. If a severe case, use double dose and double the days of treatment. It comes in capsule form that will need to be taken apart and the powder mixed with water in a syringe. This is a human drug and expensive, but it is the most effective treatment for Cryptosporidium diarrhea. May be available to your veterinarian at Cornerstone Pharmacy (859-873 – 3007/5768).

- **Dose: 11 – 22 mg/lb, PO, BID, for 5 to 10 days (1 capsule/20 lbs)**

Marquis (Ponazuril – 150 mg/mL) – used to treat *Eimeria macusaniensis (E. mac*) and other coccidia infections in camelids. No research has been done yet on the efficacy of Ponazuril on E. mac in camelids. However, research has been done to demonstrate that it is well absorbed in llamas. Because camelids are smaller than horses and do not consume an entire tube, there have been concerns about the distribution of the medication within the paste in the dosing syringe. The researchers did not look at the absorption in smaller camelids using small doses straight from the tube, but felt that the variability would more likely be due to inconsistent absorption from the first compartment rather than the distribution of the drug within the tube (personal communication). Boehringer, now owners of Marquis, said that no studies have been done to determine the distribution of the product in the tube, but commented that because one tube is a multi-day regimen for horses it should be adequate. It is also effective on regular coccidia and is the preferred drug of choice to use in adults with coccidia. There is clinical evidence that this drug may also work against Cryptosporidium diarrhea in crias. If you choose to dilute

Marquis, the recipe for dilution is to take 40 mL of the drug and add 20 mL of distilled water, mix well. This makes a 100 mg/mL suspension. Mix the whole tube up at once to ensure all the drug is well distributed. One tube makes three dilutions. For larger animals, it can be used straight from the tube, only one dose needed.

- **Dose: Dilution 100 mg/mL: 9 mg/lb, PO, SID for 3 days (9 mL of dilution/100 lbs)**
- **Undiluted Dose 150 mg/mL: 9 mg/lb, PO, once (18 mL of paste/300 lbs)**

Metronidazole (Flagyl) – used to treat Giardia diarrhea in young crias, should not be used in crias > 2 months of age.

- **Dose: 23 mg/lb, PO, BID for 5 to 8 days**

Avermectins: the two most common in this class are Ivermectin and Dectomax, they are not effective on Nematodirus, Whipworms, Capillaria and Tapeworms. May still work on some farms with simple Strongyle type infections, but unlikely. Best when used to prevent Meningeal worm infection. Should always be given SC, and they are not effective as Meningeal worm prevention if given orally or topically. Limited effectiveness with Chorioptic mange infection as the mite lives on the surface of the skin, will work on Sarcoptic mange. These drugs can be started in crias that are actively grazing (2 to 4 months) as prevention of Meningeal worm infection. Newer in this class is Cydectin® (see below).

Cydectin (Moxidectin 1mg/mL) – is a milbemycin de-wormer. It binds with specific chloride ion channels in the nerve and muscle cells of the parasite resulting in paralysis and elimination of the parasite. Cydectin comes in three forms: oral, injectable and topical. Research has shown the topical form does NOT work with camelids. The oral sheep drench is the recommended form to use in camelids following the dosing chart for sheep. This drug should be reserved for use on farms that have Benzimidazole (SafeGuard) resistant Strongyle type parasites. Just like any other de-wormer, over or inappropriate use of this drug will result in development of resistance. It has a moderate degree of safety and can cause seizures with a 2X label overdose that may not resolve. It is labeled for sheep 4 months and older, which until more information is known in camelids, should be followed with crias. Reproductive safety has not been determined yet in the US, but is used frequently with pregnant sheep and camelids. For llamas, can consider using the equine product (Quest® gel). Keep in mind that one tube of gel is enough to treat an 1150 lb horse. Make sure the dialing ring is locked to avoid overdosing. Best to squirt the desired dose into another syringe for dosing the correct amount. **Both products can cause coughing after administered**

- **Dose for Cydectin: 0.18 mg/lb, PO, Once (10 mL/55 lbs, 18 mL/100lbs of sheep drench) Double the dose on chart on Sheep drench**
- **Dose Quest gel: 0.18 mg/lb, PO, Once (2.7 mL/300 lbs) (Use only in adult llamas, too concentrated for safe use in alpacas)**

Dectomax (10 mg/mL) – longer duration of action, need to use higher dose, stings when administered so change needle after drawing up the drug. Adult alpacas 4 mL, adult llamas 9 mL

- **Dose: 2.5 mL/100 lbs, SC, every 45–60 days for Meningeal worm prevention**

Ivermectin (10 mg/mL) – shorter duration of action, stings when administered so change needle after drawing up the drug. Dosage 0.2 mg/lbs. I usually give adult alpacas 3 mL, adult llamas 8 mL.

- **Dose: 1.8 mL/100 lbs, SC, every 30–45 days for Meningeal worm prevention**

Benzimidazoles – some products have been in use for a long time and in some parts of the country have lost efficacy. Also, there is a wide range of safety, see below for specifics.

Panacur/Safe-guard (Fenbendazole – 100 mg/mL) – has the widest range of safety, can be used at very high doses. May not always be effective in all animals and in some parts of the country. To make it more effective, give at the high dose, remove feed the night before AND/OR **give BID**. Can also be used at 23 mg/lb, PO, for 5 days for the treatment of Tapeworms and Giardia diarrhea in crias. Use at 23 mg/lb, PO, for 5 days (or BID for 3 days) for Whipworms and Capillaria. Is very safe to use in pregnant females. With such widespread parasite resistance, use the **high end of the dose (23 mg/lb) and BID for 3 days as a routine for all parasites.** Will generally still work for Nematodirus when no longer works with other Strongyle type. Will always be effective as treatment for Meningeal worm infection (23 mg/lb, PO, for 5 to 10 days). **If using Safe-guard paste** for horses, etc, it is the same drug. It has a lot of non-drug carrier to make it a paste. Figure out how many mg of drug needed, i.e. 150 lbs X 20mg/lb = 3000 mg of drug NOT of the actual paste. Each gram of product in the tube has 100 mg of drug. So a 92 g tube would have 9200 mg of drug, so would have 3000 mg ÷ 9200 mg = 1/3 of the tube needed to give animal. Frequently under-dosing when using the paste as large volume needed.

- **Dose: 9 – 23 mg/lb, PO, SID to BID for 3 to 5 days (9 to 23 mL/100 lbs)**

Valbazen (Albendazole – 113.6 mg/mL) – has a very narrow margin of safety, should not be used in young crias (< 6 months old) as it can cause fatalities due to liver failure. DO NOT USE in pregnant females, can cause facial deformities in crias. Due to toxicities with overdosing, you MUST always obtain an accurate body weight

and should never use Valbazen in the same animal on consecutive days.

- **Dose: 9 mg/lb, PO, Once and repeat in 5 - 7 days if needed in severe infections (8.0 mL/100 lbs)**

Levamisole – Prohibit® powder) – works by paralyzing the parasite, which is then expelled alive. It has been used in cattle, sheep and goats for many stomach and intestinal worms, although not effective with *Trichuris spp (Capillaria??*) and Lungworms. If used as the injectable form or a high dose orally, there may be neurologic side effects. It has a narrow margin of safety and should not be used in debilitated animals unless the benefit outweighs the risk. It is generally considered to be safe to use in pregnant animals, again taking into consideration the benefit versus the risk. This drug should be used ONLY as a last resort, only after more commonly used drugs (Panacur, Valbazen, Cydectin) have failed. An exception would be in very anemic (white or pale pink mucous membranes) animals.

- **Dose: 4 mg/lb, PO, Once – compounded product. Prohibit® powder - weigh out 3 g powder and add 60 mL of water. This is 44.7 mg/mL concentration.**

10 lb = 0.8 mL, 50 lbs = 4 mL,
150 lbs =12 mL, 250 lbs=20 mL
Stable for 90 days, at room temperature.
Credit: UGA Pharmacy. Should be repeated in 7 to 10 days to get the newly emerged adults as the drug does not kill the existing larvae already in the animal.
Can cause coughing after administered.

Pyrantel Pamoate Suspension (50 mg/mL), Strongid Paste®) – works by paralyzing the parasite and is effective in horses, cattle, sheep, goats and swine against many parasites. There is minimal research done in camelids but has been used clinically and seems to be effective (Strongyle type). Since it is not frequently used, **this drug should be held in reserve for when other, more commonly used drugs no longer work**. The suspension is safer to use as it can be dosed more accurately. It has a moderate margin of safety, and should not be used at the same time as Levamisole.

- **Dose: Suspension: 6 - 8 mg/lb, PO, Once (12 - 16 mL/100 lbs)**
- **Dose Paste: 5 mL paste/100 lbs [180 mg pyrantel base/mL].**
  Should be repeated in 7 to 10 days to get the newly emerged adults as the drug does not kill the existing larvae already in the animal.

Miscellaneous Drugs

Bo-Se (Vitamin E & Selenium 1 mg/mL): used in crias as a prevention of white muscle disease (Selenium deficiency) and to stimulate the immune system. Also, can be used as a general supplement in underweight and geriatric camelids. Research has shown that Selenium absorption was rapid after injection and did not stay in the system very long. No information about use during pregnancy is available; however, it is routinely used in pregnant cattle. Be very careful only to use the Bo-Se product as Selenium overdoses occur and can be toxic. Anaphylactic reactions have been known to occur, so the animal should be monitored for respiratory failure and collapse after administration.

- **Dose: 0.025 mg/lb (1 cc/40 lbs of Bo-Se), SC**

Clostridium type C, D & T toxoid (CD&T injection): most commonly used vaccine in camelids. Mainly used to prevent tetanus. Unless a specific problem in your area, the "8-way vaccine" is not recommended. Many different protocols exist, no research on best way! This is what I recommend:

- **Cria 2 Days Old: 2 mL, SC then**
- **Cria 30 Days Old: 2 ml,SC then**
- **Cria 60 Days Old: 2ml, SC then**
- **Cria 6 months Old: 2 ml, SC then**

- **Alpacas Yearly: 3 mL , SC**
- **Dams: 3 mL, 2 days after giving birth**

Epinephrine 1:1000 (1 mg/mL, Large animal form) – animals can have anaphylactic and allergic responses to drugs and insects bites the same as humans. Any drug can be responsible, and animals should be monitored for 20 to 30 minutes for signs of adverse response after any injection are given. Signs such as staggering, difficulty breathing, hives developing around the injection site, collapse. Penicillin, as in humans, is a common culprit, but vaccines and even vitamin injections can cause reactions. **The first thing to do if you find an animal showing any suspicious signs is to call your veterinarian.** Tell them you have Epinephrine on the farm, and they will instruct you further. If your veterinarian is not available, then administer **1 mL/100 lbs, IM** and monitor their breathing. If after 15 minutes there is no improvement, then give one additional dose IM. During this time keep trying to contact your local veterinarian and keep the animal in cush position. If oxygen is available, give it.

Imodium – to help control severe diarrhea in crias and adults, to be used with Kaolin. These are estimated doses, each animal needs to be monitored for what works for them.

- **Dose: Young crias – 3 mL, SID to BID as needed**
- **Dose: Older crias – 4 to 5 mL, SID to BID as neede**
- **Dose: Yearlings – 5 to 7 mL, SID to BID as needed**
- **Dose Adults – 7 to 10 mL, SID to BID as needed**

You can mix Kaolin and Imodium together in one container (3 part Kaolin: 1 part Imodium) for convenience. Use the Kaolin dose amounts listed below.

Kaolin Pectate – to help control moderate diarrhea in crias and adults. These are estimated doses, each animal needs to be monitored for what works for them. Best to not routinely use the human version as it contains aspirin, which can be damaging in some situations.

- **Dose: Young crias – 5 to 7 mL, SID to BID as needed**
- **Dose Older crias – 7 to 10 mL, SID to BID as needed**
- **Dose Yearlings** – 12 to 15 mL, SID to BID as needed
- **Dose Adults** – 20 to 30 mL, SID to BID as needed

NOTE: it is important to determine the cause of diarrhea and not just stop the diarrhea.

Iron Dextran – for use with anemic camelids, can be used in conjunction with Vitamin B12. Iron is very irritating and will cause lameness if given IM, so **only inject SC**. To make the injection less irritating, the iron can be diluted using equal parts sterile saline. Iron can cross the placenta, so unless the life of the dam is at risk, should not be used in pregnant camelids. Iron is not readily eliminated from the body, so overdosing can be toxic. Oral iron supplementation alone is not effective in the treatment of iron deficiency anemia in ruminants. On occasion anaphylactic reactions can occur. No research has been done on the correct dose in camelids. The dose listed was obtained from a published article about treatment of iron deficient llamas. Also, this dose has been used clinically without apparent problems.

- **Dose: 300 mg (alpaca adult), 500 mg (llama adult) SC, every 3 days for 3 total treatments**

Isoniazid (300 mg tablets) – only inject SC for use in combination with antibiotics (i.e. Nuflor OR Penicillin G OR Draxxin) for chronic

infections. Most commonly used to treat tooth root abscesses or lumpy jaw. Helps antibiotics penetrate the abscess capsule. Needs to be used long term for best results. May be special order.

- **Dose: 9 mg/lb, PO, SID for 30-60 days (3 tablets/100 lb.)**

ORAL SUPPLEMENTS

There are many, many oral vitamin and mineral supplements. Few if any have been researched in camelids, even the ones labeled for camelids. Be careful of the products that contain Copper as they can be toxic/accumulative over time, like Red Cell. The products labeled for sheep and goats are probably safe to use in camelids. Some products claim to help with weight gain, and in non-ruminants, they may be correct, but products high in fat will not help camelids as they do not digest fats in the same way as simple stomach animals. One product, Alpaca and Llama Nutri-Drench by Bovidor Laboratories (and Goat drench) seems to be a safe product and although will not specifically help them gain weight it has vitamins and minerals that many debilitated animals may be lacking. Follow the manufacturer's directions.

Thiamine (Vitamin B1) – used for the treatment

of Polioencephalomalacia and any neurologic disease. Should only be used with direction from your veterinarian. Concentrations vary with different products, so calculate amount to be administered carefully. Can cause neurologic signs if too much is administered IV rapidly. Must be used with extreme caution if given IV as it can cause seizures. Start with lower dose, increase only if the animal is not responding (still depressed, blind).

- **Dose: 9 – 18 mg/lb, SC, SID to QID**

Vitamin A & D – used routinely in crias to help prevent rickets and leg angulation. Do not overdose as can cause organ failure. Injectable form is more consistently absorbed than oral form, but either form is effective. Repeat injectable form every 60 days, repeat oral form every 2 weeks. DO NOT use both forms! There are many products available, so the dose needs to be calculated carefully based on the product used. Always ask your Veterinarian if you have questions prior to dosing. The dosage needs to be calculated based on the Vitamin D concentration in the product. Dose until one- to two-years-old.

- **Dose: 1,000 IU/lb, SC, every 60 days OR 33,000 IU, PO, every 2 weeks.**

Vitamin B12 – for use with anemic camelids. Can be used in conjunction with Iron Dextran as Vit B12 helps the body absorb iron. Concentrations vary with different products. As with many medications in camelids, there is no labeled dose, however it has been used clinically for many years in camelids with no apparent problems. As a comment, it is a bright red liquid. At the end of the treatment, recheck the Packed cell volume (PCV) to confirm improvement of anemia.

- **Dose: 3,000 mcg (alpaca adult), 5,000 (llama adult), SC, daily for 7 days, then three times a week for 3 weeks**

There are **three drugs** I recommend for every farm to have readily available: **Banamine, Thiamine and Epinephrine.** As with all medications, they should NOT be stored in the barn unless you have a temperature-controlled area. Medications that undergo freezing or extreme heat are more likely to cause problems and/or not be effective. Frequently you will not use the majority of the medications before they expire. With that in mind, do not have a pharmacy of everything, just the ones most commonly used.

In conclusion, as stated above, I have provided this information to be a helpful guideline only. It is NOT meant to replace your local veterinarian. Many of the drugs listed, even the nonprescription ones can have fatal consequences if used inappropriately. The information is correct to the extent that information is available. Please share this information with your veterinarians. If you have any questions, please ask your local veterinarian or contact Dr. Walker at 419-306-9522 or **pamwalker@hotmail.com**.

References

- *Antimicrobial agents and South American Camelids – Developing rational treatment protocols*. Lakritz, Jeff, 2008 International Camelid Health Conference for Veterinarians, 44 – 55.
- *Antimicrobial drug use in New World Camelids*, Cebra, Chris. In: Antimicrobial therapy in veterinary medicine. 4th Edition, 2006. Chapter 33, 529-534.
- *Drug therapy in Llamas and Alpacas*, Fajt, Virginia. In: Llama and Alpaca Care. 2014. Chapter 34, 365-378.
- *Plumb's Veterinary Drug Handbook, 6th, 8th, and 9th Edition*
- Dr. Pam Walker, personal observation

CHAPTER 18

Alpaca Club Activities

Introduction

In Chapter 1 it was mentioned that different clubs can have different interests to focus their activities upon. Some clubs may want to focus on handling alpacas with the ultimate goal of competing on obstacle courses or in events such as showmanship. Some may focus on alpacas as livestock, and some clubs may want to focus on fiber arts, emphasizing all the wonderful things that can be done using alpaca fiber. Some clubs may want to offer activities from all three categories.

Currently most clubs and their manuals focus on the care of alpacas and participating in performance shows, and their printed information often is focused on both llamas and alpacas. There is very little information given regarding alpaca fleece, its importance, and what can be done with it.

Before you sign children up to participate in your club you should have decided what the focus of your club will be and what activities will occur to ensure that the youth have a positive experience with alpacas and/or their fiber.

This chapter is divided into two parts, the first includes activities to learn about the care and handling of alpacas and the second includes activities to learn about the special characteristics of alpaca fiber and what can be done with it. Your club can certainly include activities from either portion of this chapter.

Livestock Focused Activities

The youth group that focuses primarily on alpacas as livestock needs to provide learning opportunities that ensure the youth learn about the alpacas themselves, how to house them, how to care for them, how to feed them, and how to watch for problems that might occur. The chapters listed below include information for youth working with livestock. At the end of the chapters earmarked for youth, there is a blue box titled "What You Should Know" which lists the basic information club participants should be familiar with. Certainly the older club members, their parents, and you as a leader, can study more of what is provided, as can the younger members if they would like.

Livestock club members should read these chapters:

Chapter 2: What Is An Alpaca?

Chapter 5: Housing and Fencing For Alpacas

Chapter 6: Husbandry

Chapter 7: Alpaca Nutrition and Feeding

Chapter 8: Alpaca Anatomy

Chapter 9: The Alpaca Digestive System

Chapter 10: Alpaca Reproductive System

Chapter 11: Pregnancy, Birthing, and New Cria Care

Chapter 12: Parasites

Chapter 13: Alpaca Conformation

Chapter 14: The Alpaca Fleece

Chapter 16: Training an Alpaca

Chapter 19: Club Handcraft Projects

A Sample Schedule For A Livestock Club

This is a suggested schedule for you to customize for your particular club. During inclement weather, meeting activities could change to accommodate the conditions. Practicing going over and through obstacles can and should be incorporated in this schedule if that is going to be part of the club's focus.

Week 1: Ask parents/guardians to attend this meeting

- Introductions and reviewing the purpose and goals of the club.
- Obtain relevant contact information for each child and provide leader's contact information.
- Sign releases from liability.
- Review the Expectations of Club Members document and have everyone sign.
- Review attendance expectations.
- Discuss any volunteer opportunities for parents and participants (parades, nursing home visits).
- Review any fees that may be required and when they are to be paid.
- Distribute materials such as the AOA Alpaca Handbook.

- Provide information about AOA Youth Membership and the information available on the AOA website.
- Mention local AOA Affiliates and what they might offer.
- Review the calendar for the club.
- List any shows in which the youth may be interested in participating.

Week 2:

- Review Chapter 2 about what alpacas are and what their purpose is.
- Demonstrate and practice putting halters on alpacas and adjusting them for a proper fit (video optional).

Week 3:

- Review Chapter 5 about housing, fencing, and feeding.
- Activity: Kool-Aid dyeing of fiber in plastic bag.

Week 4:

- Review Chapter 6 about husbandry.
- Activity Make felted balls or coasters using the fiber dyed the previous week.

Week 5:

- Review Chapter 7 about alpaca nutrition with emphasis on different types of alpaca food.
- Activity: Begin practicing correct handling and showmanship with alpacas (video optional).

Week 6:

- Review Chapter 8 about alpaca anatomy emphasizing the external anatomy illustration.
- Activity: Continue working with alpacas.

Week 7:

- Review Chapter 9 on the digestive system.
- Activity: Play pin the external anatomy part label on a large drawing or picture of an alpaca.

Week 8:

- Review Chapter 12 on alpaca parasites.
- Activity: Show the different parasite medications and consider allowing the children to draw up water and inject oranges “subcutaneously” and “intramuscularly.” This requires close adult supervision.

Week 9:

- Review Chapter 13 on alpaca conformation.
- Activity: Go out to pasture or barn and review the alpacas there.

Week 10:

- Review Chapter 14 on alpaca fleece.
- Activity: Examine and skirt an alpaca fleece.

Week 11:

- Review Chapter 15 on using alpaca fiber.
- Activity: Kool-Aid Dyeing (or other dyeing if you would like).

Week 12:

- Play with alpaca fiber.
- Work with alpacas.

Week 13:

- Watch video(s) on showmanship.
- Practice leading and "presenting" an alpaca in Showmanship.

Field Trips are always fun if you can manage to get your group organized to accomplish them.

- Visit a veterinary hospital.
- Visit a fiber mill.
- Attend an alpaca show.

Alpaca Fiber Club Activities

In Chapter 19 we will provide specific projects that you might want to do with your club members. What you decide to do may be determined by what you, yourself, enjoy doing with alpaca fiber. Do consider inviting others to do demonstrations or even teach. Guilds are wonderful resources for artisans who might be willing to come and help demonstrate or instruct. Yarn shops also might know of individuals willing to demonstrate or teach. Alpaca owners in your area are often involved in fiber arts and might be another resource.

A Sample Schedule for a Fiber Club

Here are a few ideas about potential meetings for your club:

Week 1: Ask parents/guardians to attend this meeting

- Introductions and reviewing the purpose and goals of the club.
- Obtain relevant contact information for each child and provide leader's contact information.
- Sign releases from liability.
- Review the Expectations of Club Members document and have everyone sign.
- Review the attendance expectations.
- Discuss any volunteer opportunities for parents and participants (instructing, transporting, or just helping at meetings).
- Review any fees that may be required and when they are to be paid.
- Distribute materials such as the AOA Alpaca Handbook.
- Provide information about AOA Youth Membership and the information available on the AOA website.
- Mention local AOA Affiliates and what they might offer.
- Review the calendar for the club.
- List any shows that the youth may be interested in participating. AOA Fleece Shows often have Fiber Arts competitions.
- Consider asking the club members what they would like to see and learn over the coming months.

Week 2:

- Review Chapter 2 about what alpacas are and where they are from.
- Activity: Examine a huacaya fleece and a suri fleece and talk about the differences between the two. Talk about fineness and uniformity. Discuss skirting and its importance.

Week 3:

- Start to review the first few sections of Chapter 14.
- Activity: Perhaps examine several different samples of huacaya and suri fleeces to demonstrate fineness and coarseness.

Week 4:

- Continue reviewing Chapter 14. Talk about how management and stress can affect fleece quality.
- Activity: Introduce carding and flicking fiber and introduce the drop spindle for spinning.

Week 5:

- Finish Chapter 14 or begin Chapter 15.
- Activity: Continue with carding and spinning perhaps adding a spinning wheel.

Week 6:

- Discuss dyeing fiber.
- Do Kool-Aid dyeing of alpaca fiber in plastic bags.

Week 7:

- Continue reviewing Chapter 15.
- Activity: Felt balls or coasters using the dyed alpaca from last week .

Week 8:

- Discuss what happens at a fiber mill and the steps to get fiber processed into yarn.
- Activity: Begin another fiber art of the club's choice such as knitting, crochet, or more felting.

From this point forward, the activities of the club are up to the leaders and members. Field trips to fiber mills are fascinating and visiting an alpaca farm is also exciting. Other explorations could include:

- Dyeing with plants
- Crochet
- Knit
- Macrame
- Weaving
- Felting
- Lace making
- Needle point
- Needle punch
- Blending alpaca fiber with other fibers

One Last Idea:

If you are super organized and have the garden space, growing dye plants can be an exciting activity. The plants can be started at a club meeting, then either taken home for the members to grow, or if your space will allow it, grown at your home or the club's meeting location.

The possibilities are endless!

CHAPTER 19

Club Handcraft Projects

Photo by Mom Does Reviews

Wild Owl Pine Cone

Materials:

- pinecones
- alpaca fiber
- feathers
- felt
- hot glue

Instructions:

First, grab your pinecone and stuff it with small bits of alpaca fiber, pushing the fiber deep enough that some of the pinecone is still visible. You can use a pencil to help get the fiber into the deeper areas. Next, select some feathers for the wings and perhaps a head poof. Attach them with hot glue, securing the feathers into the pinecone crevices for the head and to any protruding parts of the cone for the wings. Then, cut out felt circles for the eyes and a small piece for the beak. Glue these on, and you'll have a quirky, Wild Owl that's so amusingly cute!

If you'd like to turn your owl into an ornament, you can add some string or ribbon. Just imagine the reactions you'll get from these unique, one-of-a-kind ornaments this Christmas!

Felting Balls For Dryer or Play

Materials:

- 12 to 15 ounces of alpaca fiber
- old Pantyhose

Instructions:

1. Start by removing any large debris from the fleece, such as burrs, sticks, or other foreign matter.
2. Use a shop vac to blow out any fine dust from the fleece, or wash the fleece ahead of time to remove impurities.
3. Roll the fleece into small balls and place each ball inside a piece of pantyhose.
4. Place the pantyhose with the fleece balls in the washing machine. Run a quick

hot/cold cycle with a free-and-clear detergent, such as Seventh Generation, or Dr. Bronner's Pure Castile Soap.

5. After the cycle, carefully remove the balls from the pantyhose to prevent them from felting to the fabric.
6. Place the balls back in the washing machine and run a sanitary (2-hour) cycle with extra hot water and a cold rinse. Repeat this step if necessary to achieve the desired level of felting.
7. Once the balls have been properly felted, transfer them to the dryer and dry them on a low heat setting. For a more natural finish, you can also finish drying the balls in baskets placed near a wood stove.

A fun option is to take some dyed fiber and using lower quality fiber in the middle, wrap the colored fiber around the outside of the ball to add some color. The ball can then be used for tossing around like a Nerf ball.

Photo by Kristi Porter

Kool-Aid Dyeing Alpaca Fiber

Materials:

- Clean alpaca fiber
- Sturdy 1 gallon Ziploc type bags
- White vinegar
- Packets of unsweetened Kool-Aid or egg dyeing tablets or even food coloring
- Warm water

Instructions:

- Place 2 cups of warm water in the plastic bag
- Add a tablespoon or so of vinegar to the bag
- Place a packet of Kool-Aid in the bag. You can also mix different colors to get something different
- Mix thoroughly
- Add about 1 ounce of fiber and gently (so it doesn't felt) move around to be sure the fiber is exposed to the dye solution
- Allow to sit overnight or longer
- Dye will be absorbed by the fiber possibly clearing the water of any color
- Remove the fiber from the bag and gently rinse the fiber until the water runs clear.
- Discard the dye solution, but save the bags for next time!
- Use the dyed fiber for your felting or spinning projects!

Felting Smaller Balls/Beads For Jewelery

Materials:

- Alpaca Fiber- previously dyed and finer fiber is best for this project since it will be placed next to the skin
- One small bucket of soapy water per club member
- Needle and strong thread to string the felt beads together
- Additional ceramic, wood, or other beads if you desire.

Instructions:

- Pinch off a small quantity of dyes alpaca fiber and roll into a ball.
- Immerse the ball in warm soapy water and roll and rub between the palms of your hands
- If the ball is too small, you can add more fiber around the outside of the ball to enlarge
- Continue to rub between your palms until the fibers are felted together
- When felted, rinse the beads to remove the soapy water and lay out to dry
- Using needle and strong thread or beading thread, string the beads together to make a necklace or bracelet, or earrings.
- You can also sew several balls together and attach to a key chain.
- Make several green colored beads and string together to make a caterpillar ornament with beads for eyes and yarn for legs!

Photo by Mom Does Reviews

Woolly Sheep Ornament

Materials:

- Alpaca fiber
- Styrofoam balls around three inches
- Cinnamon sticks—2 per sheep
- Black felt
- Googly eyes
- Red ribbon and/or red felt
- small bells
- dish soap
- glue gun
- ornament hook, or wire to hang it

To begin, take your Styrofoam ball and some fiber. Next soap up your hands and then grab the fiber and start layering it around the ball. Small thin amounts work best. Re-soap your hands as needed, and you will want to lather it up. The friction from your hands and the soap will create a mass of hair around the ball as you continue to layer until it is completely covered and a size you like. It will look like a messy wet hair ball. Once the fiber feels adhered together, rinse off and allow it to dry overnight.

While it dries, you can cut out a sheep face in your black felt and glue googly eyes onto it, or you can glue eyes onto the ball directly once it dries. In the meantime, you can cut or break your cinnamon sticks in half. When your ball is dry you can shove the sticks through the hair

into the ball. I made the holes with the sticks, then pulled them back out and added glue. I glued the sheep face onto the ball. On one sheep I added a red felt collar with a bell, and on the others, I tied a red ribbon on with a bell.

Lastly you add your ornament hook or wire into the back of the sheep to hang it from a Christmas tree.

Felting Stall Signs

Materials:

- Alpaca fiber that has been carded or "fluffed" (previously dyed fiber makes the sign more interesting)
- 2 Bubble wrap sheets
- Soapy water
- A water proof surface to work on in a location that will tolerate spills

Instructions:

- Place one of the bubble wrap sheets on a flat surface with the bumps up to contact the fiber. The sheet should be bigger than the planned sign
- Lay the fluffed fiber on the bubble wrap with the fiber organized so that it is going in one direction
- Lay another layer of fiber over the first so the majority of the fibers lay perpendicular to the first
- Lay a third layer perpendicular to the last
- If you like, you can add some color or even lay strips of a contrasting color to spell out an alpaca's name.
- Wet down the fiber with the soapy water
- Place the second sheet of bubble wrap over the wet fiber sheet with the bubbles facing down onto the fiber

- You can rub your soapy wet hand over the bubble to agitate the fiber and cause felting for several minutes
- Or you can carefully roll the fiber and bubble wrap into a roll and move it back and forth under your hands for several minutes.
- The name of the alpaca can be felted in at the same time, needle felted into the sign when you have finished felting, or the letters could be made out of another material and glued to the sign surface.
- When felting is complete, rinse with cool water and allow to dry. Pressing the felt between two terri cloth towels can hasten the process
- To provide some support, you may want to glue the felt to backing, such as a piece of cardboard or some wood.

Shrinking Polystyrene Crafts

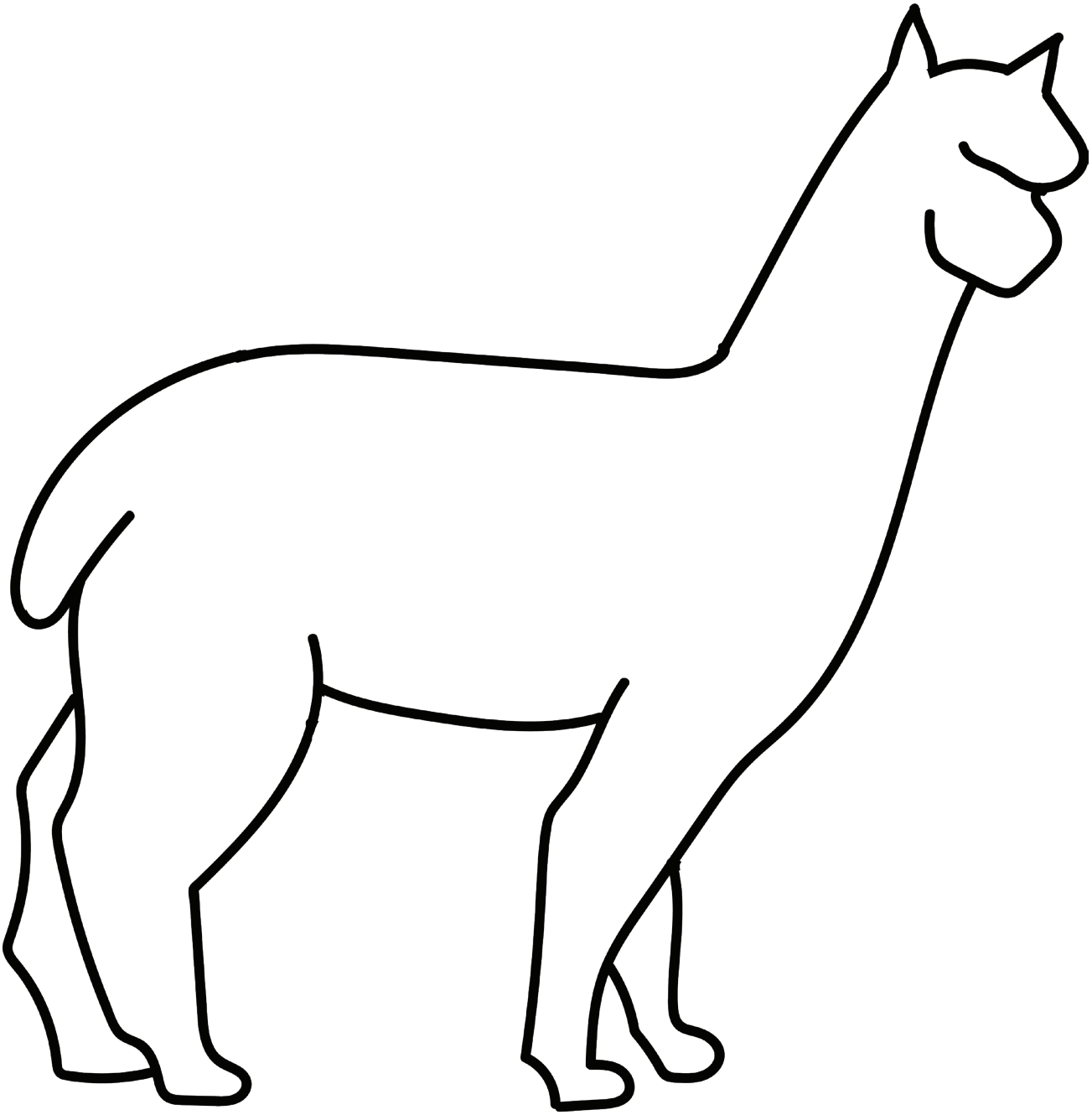
Shrinking polystyrene sheets are great for making all sorts of crafty projects. The alpaca figures provided here can be used for other activities. Be sure everyone understands that permanent markers will not wash out of clothes and protect the surface club members will be working on to prevent permanently marking the surface.

Materials:

- Shrinking plastic sheets (one brand is "Shrinky Dinks"). Clear sheets are easier to trace over, but white sheets provide better color intensity.
- Scissors.
- Permanent markers in different colors.
- Cookie Sheets with parchment paper.
- Oven.

Instructions:

- Place alpaca figure under plastic sheet and trace, or cut out the figure and trace around it on the plastic.
- Cut the alpaca out.
- Color as you like with permanent markers.
- Following directions, bake and shrink in the oven on top of parchment paper or heavy duty aluminum foil.
- The pieces will become about 9 times thicker and about 1/3 their original size
- When baking, they will initially curl, but then flatten out when baking is complete



Paracord Lead Ropes or Bracelets

There are several different knots that can be used with paracord to make lead ropes or bracelets. Craft stores have wonderful assortments of colors for everyone to personalize their project. Some knots use less paracord and others more. The traditional knot pictured to the left requires 12 inches of cord per inch of lead.

Materials:

- Paracord
- Scissors
- Measuring tape or yard stick
- Cigarette lighter to melt ends of paracord
- Brass or stainless steel snap hooks
- Rubberbands might be helpful to keep long strands of paracord organized into skeins

Instructions:

Is is suggested that you and the club members watch a video or two demonstrating different knots to decide on what knots will be used for the leads.

Be certain to burn/melt the ends of the cords after cutting for they fray quickly.

These could also be made with thick alpaca yarn.

Knitting or Crocheting With Alpaca Yarn

This is an obvious activity for any alpaca club. While it might be challenging for the youngest members, children five and six years old have learned to knit and crochet.

Crocheting might be an easier introduction to working with yarn. There is only one implement to keep track of and the work can't slip off the needles as with knitting. Using a larger crochet hook or knitting needles and heavier (fatter) yarn also make learning to knit or crochet easier.

If you are not an experienced knitter or crocheter, ask the member parents if they know how and could help, or learn right along with your members. There are plenty of beginning videos available online. Knitting shops and guilds are another source of expertise.

Start with very simple projects such as coasters or scarves. If you don't want to use good alpaca yarn, hobby shops and yarn stores have alternatives to learn with.

Natural Dyeing

Using native plants or plants that have been started by the club is a fun longer term project for your members. There are multiple resources on the Internet to learn about what natural plants might be growing in your area that can be used to dye alpaca. There are also many books dedicated to the topic of natural dyeing. You can also purchase plant material online to use for dyeing and most of it is very reasonably priced. There is also an insect called cochineal that when ground creates a deep red powder that intensely dyes animal fiber. This is what the Navajo used to create red yarn in their beautiful woven rugs.

You can choose to dye alpaca yarn, the alpaca fiber, or something already made, such as a felted coaster, or a scarf. So here we go.

Materials:

- Whatever you want to dye
- Water, preferably free of minerals and softened.
- Your plant material (s)
- Heat source a stove or hot plate
- Rubber gloves
- Vinegar (acetic acid) or Citric acid to make the dye solution slightly acidic
- Alum (mordant
- 3 gallon pot - must be enameled or stainless steel
- Nylon mesh to serve as a sieve
- Nylon mesh bag, I took a piece of mesh

and sewed it into a bag to hold plant material for companion dyeing

- Spoon or something to gently stir with
- A five gallon bucket to pour the dye "liquor" into
- A clean bucket or container to presoak your fiber in
- pH strips (litmus paper) to test the pH of your dyebath
- Digital thermometer to test dyebath temperature
- Measuring cups and spoons
- A notebook to write down what you did and your results

Instructions

- It is always recommended to **presoak** whatever is going into the dyepot. This can be done using mineral-free water, a mordant bath, or a slightly acidic (lower pH) bath. Presoaking helps ensure more even dye absorption.
- **pH** is another important factor in dyeing. It refers to the concentration of free hydrogen ions in a solution. The pH scale ranges from 0 to 14, with 0 being extremely acidic, 14 being extremely basic, and 7 being neutral—neither acidic nor basic. Extremes on either end can not only cause skin burns but also damage your fiber. If you're using crystals or powders to adjust pH, be sure to dissolve them in water before adding your fiber, as acetic acid crystals, for example, can burn through a strand of yarn. For natural dyeing of animal fibers, a pH of 7 is generally recommended, but I typically work with a slightly acidic pH of around 5. Cellulose fibers, on the other hand, require an alkaline pH for dyeing.

- **Mordants**: These are metallic salt compounds added to water and used as a presoak before dyeing. They act like a binder, helping the fiber absorb the dye more effectively. Mordants can enhance the intensity of the dye and even modify the color outcome. While mordants are not required for dyeing alpaca fiber, they can improve dye uptake, helping you get the most vibrant results. A good mordant bath recipe is 2 gallons of water, 3 tablespoons of alum, and 3 teaspoons of cream of tartar. Soak your yarn or material in this solution for at least two hours.
- There are two different ways to dye using natural dyestuff. Both use some sort of fabric to keep the yarn and plant material separate. One version is placing the plant material in the pot, covering it with two or more gallons of water, and simmering for an hour or two. Remove it from the heat, allow to cool, and then strain the liquid to remove the plant material. I used nylon gauze-like cloth stretched over a five gallon bucket held in place by a bungie cord to strain the plant material out of the liquid.
- After straining, place the solution back into a stainless steel pot. Be sure to loosen the ties around the skeins to be certain all the yarn has easy access to the dyebath.

Place the pre-mordanted and presoaked material into the pot and onto the stove or hotplate. One should never throw yarn or fiber into a hot pot of liquid. Instead, you should bring it up to a simmer from room temperature. Bring the pot to a very slow simmer never to exceed 180 degrees. The above method is simply called **immersion dyeing**.

- The other method used is referred to as **companion or simultaneous dyeing**. In this case both the plant material and the fiber or yarn go into the pot simultaneously. So technically, the fiber is still immersed but is placed in the pot with the plants, but the dyestuff is placed in a bag as though it were a giant tea bag. A fine nylon mesh bag can be used for both the "tea bag" and for straining. It will not absorb any color, is slippery which prevents the plants from sticking to it, and rinses completely clear for use next time.
- No matter how the dye solution was created, place your alpaca materials in cool dye solution and be very careful to bring it up to just under 180 degrees and keep it there for at least an hour. Allowing things to boil, adversely affects both the yarn and the dye, so it is important to monitor your pot while it is on the burner.
- Once an hour of simmering has passed, turn off the heat and allow the yarn and pot to cool overnight. In the morning, if there is any obvious color remaining in the pot, you can remove the skeins, squeezing them out over the pot to save any left over dye for potential use later. Dyers say you can hold solutions for several weeks if you keep them refrigerated.
- Rinse the newly dyed material throughly with cool water, but do not agitate or it might felt!

Walnuts, walnut hulls, dye solution, and dyed yarn

Starting Plants From Seed

An associated project can be to have the members start dye plants from seed, transplant them into a garden (theirs or yours) and then harvest and use their own plants for dye.

Materials:

- Paper cups
- Seeds (check online) African marigolds are easy
- Potting Soil

Instructions:

- Start in cups following directions on seed packet
- Transplant when there are at least two sets of mature leaves, after danger of frost
- Harvest and use or dry for later use

Top downward: Pokeweed over goldenrod, pokeweed over indigo, indigo over goldenrod, indigo, walnut, pokeweed, ragweed, nettle, and goldenrod

Ragweed plant, dye solution, and dyed yarn.

Needle Felting Ornaments

This is a great way to introduce needle felting to club members. Using cookie cutters helps protect fingers from getting poked by the needle. Additionally, fiber dyed with Kool-Aid or Easter egg dyes can be used for this project.

Materials:

- Alpaca fiber, either separated and fluffed or carded
- Felting needles
- Cookie Cutters
- A firm foam pad to felt upon

Instructions:

- With one hand, press cookie cutter firmly on foam pad to prevent fiber "leaking out" from underneath
- With opposite (dominant) hand, layer fiber inside the cookie cutter, filling any nooks or crannies
- Use the felting needle to felt the fibers together, felting evenly around the inside of the cookie cutter.
- You can add more fiber to insure even thickness.
- When firmly felted together, carefully peel the felt off the foam, flip the cookie cutter, place the felt back in the cutter and needle felt this opposite side until firm, adding more fiber if necessary to even out thickness.
- When done, you can add any decorations to finish.

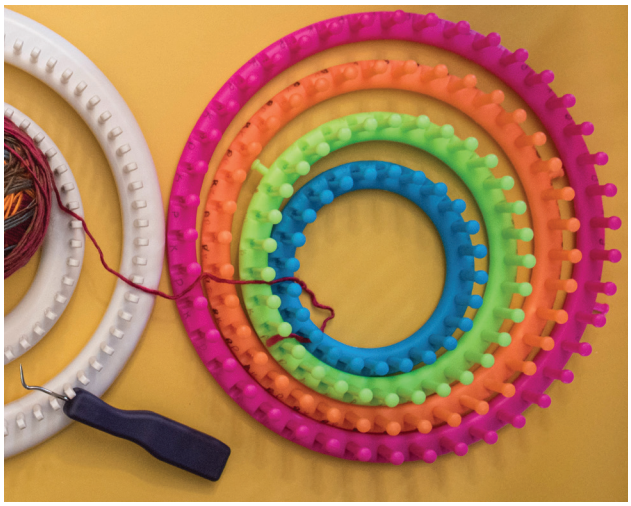
Peg Knitting Looms: Hats & Other Things

Materials:

- Alpaca (or other) yarn
- Knitting Loom available at craft stores or online
- Knitting loom pick
- Scissors

Instructions:

- These looms are an excellent introduction to the concept of knitting without using needles- much easier for young hands
- There are multiple loom sizes so that you can make anything from slippers to lap afghans.
- There are multiple videos online about the different projects that can be done on these looms.
- Best hats are made by doubling the length of the hat desired so that it is double thickness and extra warm.
- Looms also come with written instructions



CHAPTER 20

Organizing a Youth Event

Introduction

Alpaca Owners Association (AOA) and its affiliates are responsible for organizing many youth competitions across the country as part of AOA certified shows. County and state fairs can also have youth events. There may be other times that an energetic individual or team might want to plan a youth event separate from any other fair or show, such as an educational event or a camp.

Before tackling putting on an event of your own, it is highly recommended that you shadow and/or help with putting on a similar event with someone that has experience. This will give you a better understanding of what such a challenge entails and the details you will need to keep track of.

AOA Shows

The Alpaca Owners Association and its Affiliate Associations often hold youth competitions at halter shows. A special ring is reserved for Showmanship, Obstacle, and Public Relations contests. The Show Superintendent for the show is responsible for creating the class sheets and forms necessary for the AOA trained and certified judge to use. At these shows, the affiliate assists with identifying a judge and helps recruit a qualified person who will manage the course and acquire the necessary equipment. By participating in these shows, the club leader is relieved of some of the larger responsibilities for the event, but affiliate shows are always looking for volunteers to help achieve success.

County and State Fairs

As with AOA certified shows, the staff and directors of the fairs are responsible for organizing these events. Club leaders, parents, and participants just need to worry about showing up and being good sportsmen during the competitions.

The Alpaca and Llama Show Association (ALSA)

This national association also has shows across the country. Their format is similar to AOA's and they also have individuals responsible for putting on the show. This show association has their own judging system and many of the same competitions that AOA offers. Many of the competitors are showing llamas and the competition is very strong. The AOA Show system was originally modeled after ALSA's which has been in existence several years longer than AOA.

Personnel

If you are going to organize an event independent of the above organizations, it is important to have key people in charge of organizing and running it to ensure participant safety and a great experience for everyone involved, especially the young people.

- Event Organizer(s): This individual will oversee identifying the event location, arranging for any essential equipment, ensuring there are enough volunteers,

recruit one or more judges, recruit a superintendent, and recruit participants.

- Show Superintendent (if it is an AOA competition): The person that manages the entries, constructs the class sheets, and determines and reports the placements.
- Clerks to add up score sheets of the competitions.
- Obstacle Organizer: If this is a Performance competition. The person who secures the obstacles and designs the course and manages the course during the show.
- Judge to evaluate and score the entrants.
- Instructor and assistants: if this is an educational event, you will need to determine the topics to be covered and identify who will be speaking.
- Someone to organize any materials the event requires such as educational materials, diagrams for the obstacle course, placement cards, ribbons, snacks, and drinks.

If several clubs are going to participate in your event, it is certainly reasonable to ask that the other club leaders and/or parents help with some of the above responsibilities.

Budget:

No event can be run without expenses. It is important to develop a budget to cover the cost of your activities. Consider:

- **Costs:**
  - Of a venue
  - Of a judge or instructor and their travel fees
  - Cost of ribbons
  - Snacks and drinks
  - Materials
- **Sources of income:**
  - Participation or entry fees
  - Sponsorships
  - Advertising in show book or educational materials

Venue

- Sadly, very few venues are free and you may have to do a bit of "shopping" to find a location that fits your needs and budget.
- County fairgrounds are a great place to start, but usually aren't free.
- Extension offices are great locations for club meetings and educational events, but finding availability can be challenging.
- A farm or ranch might work well, but you must be careful about parking and trailer accessibility.

- Wherever you hold the event, you will have to determine a way to stall animals. Some fairgrounds will have pens or stalls available in certain buildings.
- You may have to supply bedding for animals that is alpaca friendly- not wood chips or materials that can get caught in fleeces.
- Remember that there will be cleanup after the event is through.

Conflicts of Interest

Humans are competitive by nature and sometimes jump to conclusions that a judge has shown favoritism in the show ring. When the competition involves youth, parents may claim that a judge did not treat their child fairly. To avoid the appearance of favoritism, it is important that judges are not related to exhibiting youth. The AOA Show System Handbook discusses and defines conflicts of interest, and although these pertain to halter and fleece competitions, it can also be a helpful guide to Youth competitions. It may be helpful for you to anticipate how you and your team will handle unhappy competitors and/or their parents or leaders in advance of your event, so that you are prepared to respond to these difficult situations.

Veterinary Checks

- Each state has different requirements for events involving livestock and individual venues may have their own.
- To guarantee the health of animals, most alpaca events require that animals be checked by a veterinarian for contagious diseases before they enter the venue. Often that alpacas are also required to be checked by a veterinarian before they leave for the show.
- Crossing state lines with livestock always requires a signed veterinary certificate confirming each alpaca being transported is current with any testing or vaccinations that are required by that state.

CHAPTER 21

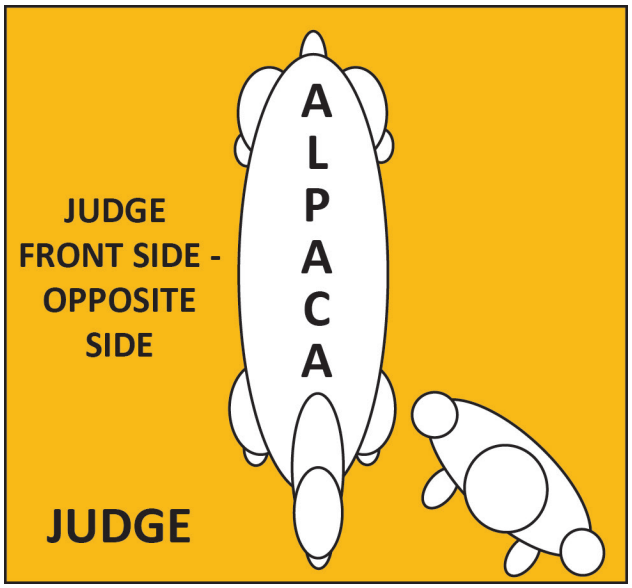
Showmanship, Obstacle, Public Relations, Costume, Youth Halter, and Youth Judge Training Competitions

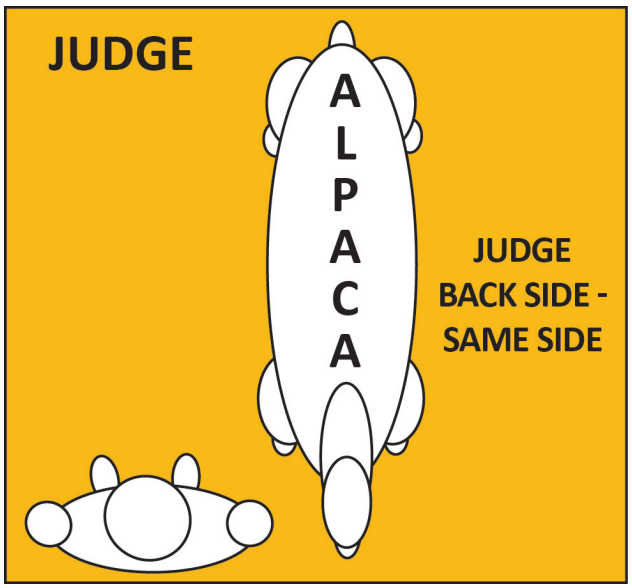
All of the competitions described here have specific rules and expectations defined in the AOA Show System Handbook. This handbook gets reviewed and updated annually and should be referred to for the "particulars" of these competitions, for they might change. Please consider the current years Show System Handbook to be the final rule on any questions you might have about these competitions.

Showmanship Introduction

Showmanship and Performance classes make up the bulk of the competitions offered for youth. These often represent the culmination of a livestock club's year of working with alpacas. Each of these events displays the quality of the relationship developed between the youth exhibitor and the alpaca they are leading into the ring. Although an alpaca can act out of character at a competition, the event usually demonstrates how much the club members have worked to earn their alpaca's trust. The higher the level of trust, the better the team performs.

As with all other livestock species, in the Showmanship competition the handler is the one being evaluated. Their objective is to constantly be attentive to the judge and to always be "showing off" their alpaca to its best advantage. They should be presenting their alpaca so that it is standing in a manner that allows the judge to see its conformation and when it is time, the alpaca should hold still for the judge to evaluate its fiber.





Both handler and alpaca should be "well attired." Proper and clean footwear for the handler- trimmed toes for the alpaca. Clean shirt and pants for the handler- a fleece that is free of beans or vegetable matter for the alpaca. A smile and attentive expression for the handler- an alpaca that allows its teeth to be shown and stands smartly.

Both handler and alpaca should be poised and confident, not fearful and shy. The team is out in the arena presenting themselves as a positive example of the alpaca industry to the public, and should want that image to be as positive as possible.

The judge will ask the team to do certain procedures, so it is important that the exhibitor pays attention when they are in the ring, always keeping their eyes on the judge, even if the judge is busy evaluating someone else's alpaca.

- **Your Attire:** The generally accepted attire for Showmanship competitions is that the exhibitor be dressed with a light (usually white) top and dark (usually black) pants. The shoes or boots must completely enclose the foot- no open toes or heels.
- **Your Alpaca:** Your alpaca can be shorn or in full fleece. The fleece should be as free as possible of beans and vegetable matter. The halter should be properly fitting and it always looks best to have halter and lead matching in color. Toenails should be trimmed and the area under and around the tail should be free of manure.
- **Leading Your Alpaca:** When leading your alpaca, it should always be lead on your right side. Your hand should be 6 to 12 inches from where the clasp attaches to the halter. If the alpaca is well trained, there will be slack in the lead rope between your hand and the halter, even as you lead it around thr ring. The remaining lead should be collected in a figure 8 formation and held in the left hand, never dangling and **never wrapped around the hand or wrist!**

Always Walk With Your Alpaca To Your Right. NEVER Walk Backwards!

- **Your Position Relative To The Judge:** As you are exhibiting yourself and your animal in the Showmanship competition, it is important that you pay attention to where you stand next to your alpaca as the judge moves around the ring and the exhibitors. When standing next to your alpaca, you should position yourself so that you are at a 45 degree angle to your alpaca as demonstrated in the diagrams on the previous page. The rules for where you stand as the judge moves around the ring, come from showing other livestock such as cattle and horse which larger than alpacas and would obstruct your view of the judge when the judge moves to the rear of the animals. Changing your position allows you to always see the judge so that you can be sure to follow their instructions.
- **Positioning Your Alpaca:** As you exhibit your alpaca, the judge or ring steward will ask you to place your alpaca in profile (the side of the alpaca is presented to the judge) or facing forward (the alpaca is looking straight ahead at the judge). As the handler you should have your alpaca stand perfectly still with the front feet

even with each other and the back feet the same way. You should try to make your alpaca look as perfect as possible, with a straight topline, adequate space between the legs, and the legs set properly under the hips and shoulders. The alpaca should not be jumping around. You should be able to show the teeth and your alpaca should hold still when the judge examines its fleece. Ideally, you should also know the alpaca's age and when it was last shorn.

- **Talking With The Judge:** Part of the Showmanship competition might include having a brief conversation with the Judge. The judge may ask questions about alpacas and the exhibitor's experience with them. The exhibitor might give the wrong answer, but that does not affect their placing. The exhibitor is being evaluated on their abilities to communicate and handle themselves as they speak with the judge. Judges like to see smiling faces, have eye to eye contact, and a confident exhibitor who communicates well. It is certainly appropriate for the exhibitor to say, "I do not know the answer, but may I guess?" Or they may simply say, "I'm sorry, I don't know the answer to that question."
- **Turning Your Alpaca:** There are two turns that a judge may ask you to do, the

forehand turn and the haunch turn. These terms have their roots in horsemanship.

- **The Forehand Turn:** The best description of this is to pretend that your alpaca has its two front feet in the center of a tire. You then ask your alpaca to turn keeping its front feet in the tire, changing direction by moving its back legs in a circle.
- **The Haunch Turn:** In this turn, the alpaca pivots on its hanches or back legs/feet. So in this case imagine that the back feet are in the center of the tire and the front legs move to make the turn.

- **Scoring and Placement:** Showmanship is an evaluation of how well an exhibitor shows their alpaca. Scoring includes points for attention, proper positioning, attire, alpaca behavior, alpaca appearance, and following instructions. The exhibitor that scores the most points in these various categories will be awarded the blue.

Public Relations Introduction:

This competition serves to demonstrate how well the handler/alpaca team would do if they were to venture out in public participating in a parade, visiting a school, going to a nursing home, or even helping with an event at the farm. The challenges in this event are designed to simulate noise, people touching, and distractions.

- **Your Attire:** The Public Relations class is not as concerned with the exhibitor's appearance as the Showmanship, but generally, your clothing should be neat and clean. At a show, the public may be visiting and watching so it makes sense to put your best foot forward in the ring, showing respect for the show, your fellow competitors, and the public. Your shoes must be closed toe and closed heel.
- **Your Alpaca:** No matter what competition you are participating in, your alpaca should be as clean as possible. There should be no alpaca beans or large bits of vegetable matter on your alpaca. The alpaca can be recently shorn, or in full fleece ready to be shorn. Their toenails should be trimmed.
- **Leading Your Alpaca:** The well trained alpaca will be eager to walk beside you. The best trained alpaca will walk beside you with little or no tension on the lead. The alpaca should be led with you to the left of the alpaca (put another way the alpaca should be on your right). You should be even with the alpaca's head and neck, neither in front of, nor being pulled from behind. Never wrap the lead rope around your hand or wrist. Your right hand should be the closest hand to the alpaca. The extra length of the lead rope needs to be collected in the left hand with nothing dangling down. It is best to use a brisk pace.
- **Performance Obstacles:** The judge will either post a map of the course for you to study and follow, or they will take you (without your alpaca) through the course. It is mandatory that you follow the course pattern exactly. There are many different obstacles that can be used to challenge the team. Mirrors, sqeeky toys, a person touching the alpaca, getting on and off a trailer, walking under or through something that touches the alpaca- anything that simulates what they might encounter in a public setting.

- **Scoring and Placement:** In this event the team is scored on how they work together to get through the course. Deductions are made for refusing an obstacle, having a tight lead, Holding the lead rope incorrectly, pulling on the alpaca to make it move, jumping off an obstacle. Usually each obstacle is worth 10 points and the judge subtracts from those points when thing don't go perfectly. Performance faults are listed in the AOA Show System Handbook.

Obstacle Introduction

This competition is similar to the Public Relations competition, but focuses on what the alpaca and handler might experience if they were to go on a hike or venture around the farm. The obstacles in this competition may be more whimsical or even more challenging. The more a club member can take an alpaca out into different situations, the stronger the bond and trust between them so that when they are faced with a new challenge they are more likely to cooperate and not "spook" or shy away in fright. Competitors have been known to even bring their alpacas into their homes to walk around to be exposed to different objects, sounds and people.

- **Your Attire:** As with Public Relations, your attire is not as critical as in Showmanship. Even though points will not be deducted from your score because your clothes are not neat or clean, please remember that we want to present a positive image to other exhibitors and the public that may be watching you go through the course. Your footwear must have closed toes and closed heels.
- **Your Alpaca:** Just like in the other competitions, please make sure your alpaca is as clean as possible! Clipped toenails make it easier for your alpaca to navigate over obstacles.
- **Leading Your Alpaca:** As with the other competitions, the more you work with your alpaca the more your alpaca will trust you. The obstacle is designed to challenge both you and your animal to face new obstacles and see how you respond to them. If the alpaca is comfortable with you, the lead may be able to be more slack and the alpaca will walk easily over and through the obstacles to your right side

without hesitation. Never walk backwards when going through the course.

- **Course Obstacles:** The judge will either post a map of the course for you to study and follow, or they will take you (without your alpaca) through the course. It is mandatory that you follow the course pattern exactly. Obstacles will vary from the Public Relations course, but often include things that imitate challenges you might face if you were to take your alpaca on a hike through the country side. Bridges, ramps, teeter totters, tarps, and getting on and off trailers are possible obstacles.
- **Scoring and Placement:** Just like Public Reations, in this event the team is scored on how they work together to get through the course. Deductions are made for hesitiating or refusing an obstacle, having a tight lead, pulling on the alpaca to make it move, jumping off an obstacle and other misbehaviors. Usually each obstacle is worth 10 points and the judge subtracts from those points when thing don't go perfectly. Performance faults are listed in the AOA Show System Handbook.

Costume Competition

No event is better attended by the public than the costume competition. It is great fun for everyone. There are three components. The alpaca's costume, the exhibitor's costume, and the story that is written and read to tell about the entry's costumes. The judge makes their placement based only on the costumes of the exhibitor and especially the costume worn by the alpaca. No scores are provided for this competition. The placings are based on:

- Coordination of the costumes between the alpaca and its handler
- Complexity of what the alpaca is wearing. Generally the pair will be rewarded for:
  - Items worn on the alpaca's head and face (do not obstruct its vision)
  - Items worn on the back and extend under the belly and/or chest
  - Items worn on the legs
  - Items that bounce and bump on the alpaca as it moves
  - Items being pulled by the alpaca
  - The complexity of the theme
  - The imagination and creativity of the theme

Fun Competitions: Some shows offer additional competitions that are not awarded points or ribbons, but are guaranteed fun for the participants and the audience as well. A few of these are:

- Egg and Spoon race
- Simon Says
- Gambler's Choice where the handler takes their alpacas over the obstacles in a set amount of time to accumulate as many points as possible.
- Alpaca Limbo

- Alpaca High Jump

Youth Halter Competition: This event mimics a regular halter show but is only conducted for exhibitors that are under 18 years of age. Exhibitors are expected to do their best showing off their alpacas, but ribbons are awarded based on the positive qualities of the alpacas entered. If a group is interested in holding such a competition, it is suggested they contact the AOA Show System Administrator before they begin organizing. Huacayas should compete only against other Huacayas, and Suris should only compete against Suris. It is strongly suggested that alpacas be separated first by gender, then by age, and then by color. Caution should be exercised with allowing a smaller youth to take a large intact male or poorly trained alpaca into the ring since the judge will be doing a thorough evaluation of the animal.

Youth Judging Competitions:

Introduction: There are two different types of Youth Judging Competitions and details can be found on the AOA website and within the AOA Show System Handbook. The purpose of the events is to encourage youth to become more knowledgeable about alpacas as well as build confidence in the participants.

Each of these competitions require exellent organization and management for they demand retaining a facility or space at an alpaca show, alpacas and handlers, and the commitment of those alpacas and handlers for most of the day.

The Winjudge software requires and knowledgeable (and reliable) individual to enter the results into the program so that it can compute the placings of the competitors.

1. The Youth Alpaca Judging Competition: This event typically lasts for an entire day or even two days, depending upon how much education and instruction is provided prior to the actual competition. It is modeled on other youth judging competitions that occur with

other livestock. Below are some quick aspects of this competition, but for more information please refer to the AOA Show System Handbook. This competiton requires at least 16 alpacas and handlers.

- The age divisions are the same as those for other youth competitions, Senior, Intermediate, Junior, and Sub-Junior. Competitors can compete as teams of up to 4 youth or they can compete as individuals.
- The youth are expected to judge the alpacas just as an AOA judge does, including but not limited to gait, conformation, bite, genitalia, and fleece characteristics.
- The youth will judge 4 classes of alpacas.
- Each class will have 4 alpacas that must be AOA registered.
- The competitors have 15 minutes per class to judge and place the class on placing cards.
- The youth can use blank notebooks or sheets of paper to make notes.
- Senior and Intermediate age group competitors will be required to provide oral reasons on two of the classes they have judged.
- An AOA Certified Halter Judge must evaluate and place the classes with their cuts on a placing card.
- The AOA Judge will score the oral reasons of the competitors
- "Winjudge" software will be used to place the contestants. This software must be purchased by the entity holding the event.

2. Youth Judge Training Competition: This competition is newer to the AOA. It is a hybrid of the Youth Alpaca Judging Competition and an educational event geared toward youth. These training and competition events may only be taught and conducted by AOA Certified Halter Judges. Specially qualified instructors may be invited to assist with instruction only with approval of the AOA Show System Administrator. This event consists of three major components:

- Classroom experience providing handouts reviewing alpaca conformation and fleece characteristics as well as PowerPoint presentation illustrating correct and incorrect traits
- Hands On alpaca evaluations with animals brought to the participants for examination and discussion as a group
- The Competition where the youth judge two classes of four alpacas and place them. They then return to provide their oral reasons to the judge.

An AOA certified Halter Judge is retained to place and provide cuts for the 4 alpacas in each class. After the youth have done their evaluations and placings, Winjudge software is utilized to score and place the competitors.

Glossary

Annualized Weight: The clean fiber weight from an alpaca adjusted to reflect the length of time between shearings.

Architecture: General structure and lay of fibers within the locks which go together to make up the fleece as a whole.

Arm: The region of the forelimb between the shoulder and elbow.

Back: The term "back" of the alpaca can be used two ways. The back is that part from the base of the neck to the tail head formed by the vertebrae. Back can also be used for topline, though topline is a more precise term.

Balance: A component of conformation; symmetrical proportioning of the body parts in relation to each other. The legs and neck should be the same in length and approximately two-thirds of the length of the body.

Banana Ears: Asymmetrical curving ears, as on a llama.

Base Narrow: Legs or feet too close together.

Base Wide: Legs or feet too far apart.

Belly: Abdomen, or the area of the body between the chest and hips; can also refer to the fiber from the lower abdominal area of the alpaca.

Bilateral Cataracts: An abnormality in one or both (bilateral) eyes characterized by opacity of the lens.

Blanket: Back and side of a fleece from the base of the neck to the base of the tail and sides from backbone to belly, elbow (front legs) and stifle (hind legs).

Body Capacity: The breadth and depth of the body, chest, and abdomen.

Body Condition: The relative amount of muscle and fat that is carried on the frame or body of an animal.

Break: A weakening of fibers in the staple, allowing them to break under strain.

Breast: The front of the body between the forelimbs.

Breeder: The individual(s) shown on the AOA Alpaca Registry Certificate as the "Dam Owner at time of Conception"; the individual(s) who decides to which male the female will be bred.

Breed Type: Characteristics specific to Suri or Huacaya.

Brightness: A term used to describe the property by which fiber reflects light.

Brow: Front half of the topknot for the purposes of defining a classic grey alpaca.

Buck Knee: Forward at the knee or carpus.

BVDV: Bovine Viral Diarrhea Virus.

Calf Knee: Back at the knee or carpus.

Camped Out: Front legs out in front and/or hind legs out behind.

Camped Under: Front and/or hind legs too far underneath.

Cannon: The metacarpal area between the knee and fetlock, or metatarsal area between the hock and fetlock.

Certificate of Veterinary Inspection (CVI): Official health certificate obtainable only through an accredited veterinarian. A CVI is required for every alpaca that enters any AOA Certified Show venue.

Character: Term used to express the regularity/evenness of structure throughout the staple and entire fleece.

Cheek: The side of the face below the eyes.

Chest: The region formed by the ribs, thoracic vertebrae, and sternum.

Classic Grey (Silver and Rose): The alpaca must have a predominantly white face. It may also have white on the brow, front of the neck (tuxedo) and front of the legs.

Coarse: Fiber of large diameter.

Cocked Ankle: Knuckled over.

Color Designation: Refers to one of the colors shown in the current AOA Color Chart plus the Classic and Modern Grey, Indefinite, and Multicolor types.

Color Group: Is a combination of color designation.

Composite Class: Alpacas are evaluated in a shorn class where only conformation is judged and their fleece is judged and the results combined to place the class.

Conformation: The alignment of all the parts of the body. It includes their proportion, their shape, and their balance with one another.

Cotted: Fiber matted together.

Cow Hock: Hocks pointed medially (inward) when viewed from the back of the animal, often making the back feet point outward.

Crimp: A zig zag pattern of Huacaya fiber. It should occur uniformly from skin to tip and appear evenly across the fleece.

Croup: The rump. The area starts at teh start of the pelvis and goes to the head of tail.

Cryptorchidism: When one or more testicles fail to descend into the scrotum.

Dental Pad: The most forward portion of the upper jaw which meets the incisors of the lower jaw.

Dropped Fetlocks: Weak fetlock joints that allow the pasterns to rest closer to the ground than is normal. Also known as collapsed pasterns.

Ectopic: Refers to something being out of place such as testicles that are not in the scrotum.

Elbow Joint: Joint between the humerus and radius in the front leg. The joint betwen the upper and lower front leg.

Entropion: The eyelid is turned inward so the eyelashes rub against the eyes.

Exhibitor: The owner who enters a fleece or alpaca in a competition.

Family Member: A spouse/domestic partner, parent, child, child's spouse, or any other family member living with an alpaca's owner.

Fetlock: The joint between the cannon (lower leg) and the phalanges (foot).

Forehead: The region in front of the ears and between the eyes

Foot: The area of the phalanges including the digital pad and nails.

Fused Ears: Ears improperly grow so that they are not properly shaped and the cartilage is abnormally thick and misshapen.

Fused Toes: A birth defect where the toes are not separated as they should be.

Gaskin: The region on the back leg between the stifle and the hock.

Gonadal Hypoplasia: Gonad refers to either ovaries or testicles and hypoplasia means less developed. This is a heritable defect that causes an unusually small ovary or testicle.

Gopher Ear: Abnormally short ears.

Guard Hair: Strong, coarse fibers, that stick out from th fleece. They usually have a hollow core called the medulla.

Handle: The tactile feel of a fleece, whether it feels soft or harsh.

Handler: The person who is leading an alpaca in the show ring.

Haunch: Refers to the buttocks or thighs.

Haunch Turn: Refers to the handler turning into the alpaca so tht it pivots on its hind quarters. Because the handler always leads with the alpaca on their right, this means the team is turning to the right.

Hermaphroditism: A heritable defect where an animals has reproductive organs of both sexes.

Hip: The joint between the femur and pelvis- the coxofemoral joint.

Hock: A joint in the rear leg between the cannon bone and the tibia.

Humped Back: The topline is curved upward.

Juvenile: Term used in alpaca shows referring to alpacas aged between 6 months and 1 year.

Kyphosis: Abnormal curvature of the back so that it curves upward.

Lateral: Refers to something toward the outside (left or right side) of the animal.

Loft: The springiness in fiber as it return to normal position after it has been squeezed.

Loin: The region on each side of the lumbar spine.

Luster: The sheen or reflection of light from fiber. Often used when describing Suri fiber. Affected by the length of the scales on a fiber.

Luxating Patella: A condition of the back leg where the kneecap dislocates out of its normal position.

Natural Pasture Condition: The alpaca and/or its fleece is presented without grooming and manipulation to enhance it for competition.

Malocclusion: Imperfect alignment of the teeth and jaw.

Medial: Toward the center or middle of the alpaca.

Micron: A unit of measurement equal to one thousandth of a millimeter and used to describe the width of fiber.

Open Fleece: A fleece that does not hold together well, probably less dense.

Owner: The individual(s) who owns the alpaca or the individual(s) entering the alpaca or its fleece in a competition.

Pad: The underside or bottom of the foot.

Pastern: The region between the foot and the fetlock- over the first phalanx.

PCR: A Polymerase Chain Reaction test- the type of test used to check for BVDV which is a required test for entry into and AOA certified show venue.

Persistently Infected (PI) cria: A cria who was infected with BVDV while in utero and continues to be contagious after it is born and often fails to do well.

Pigeon Toed: The front feet are pointed medially or toward the alpaca's center.

Plucking: Removing the straight. coarse fibers from an alpaca's fleece.

Post Leg: The back leg does not post adequate angulation making the leg more straight and possibly making the rump rise higher than the topline.

Prickle: The sensation created by stronger fibers sticking up out of a fleece, yarn, or garment. "Scratchy" and "itchy" are other terms used.

Primary: Refers to the first fiber follicles to mature in the skin of the cria while in the womb (in utero). Primary fibers arise from primary follicles. Primary fibers are generally coarser than secondary fibers.

Prime Fiber: The best fiber the alpaca produces, found in the region called the blanket- along the topline and down both sides of the chest and abdomen. May extend into the upper legs and neck.

Quadrant Position: The place where a handler stands while exhibiting an alpaca in the ring so that they do not obscure the judge's view of the alpaca.

Rope Walking: The alpaca moves in a way where both front and back feet walk as though on a tightrope, both front and back being placed directly under the alpaca on a midline.

Rump: Also called the croup. It begins where the sacrum begins at the topline and ends at the start of the tail.

S/P Micron Range: The estimated difference between the primary and secondary fiber diameters.

Scoliosis: An abnormal curvature of the spine from side to side.

Second Cuts: Small pieces of shorn fleece remaining in the fiber caused by the shearing running over the alpaca's fleece a second time.

Secondary: Refers to the fiber follicles that mature subsequent to the primary follicles in the skin of the cria in the womb.

Show Ready: An alpaca or fleece that is in good condition and worthy of being exhibited in the show ring or fleece room.

Sickle Hock: Too much angulation at the hock joint when viewed from the side.

Skirting: The process of removing lower quality fiber as well as vegetable matter, dung, and urine stained fiber from a fleece before entering it in a competition or processing into yarn.

Soundness: Free from defect, disease, or injury.

Splay Feet: Feet pointing laterally (to the side).

Splay Toes: Toes spread apart instead of being adjacent to one another.

Staple: The arrangement and alignment of fibers in a group in a huacaya fleece.

Staple Length: The length of a staple of fiber in a huacaya fleece measured from skin to the tip of the fiber.

Swayed or Sway Back: The alpaca's topline drops downward in the middle. Opposite of humpbacked.

Tender Fleece: A fleece with fiber that breaks when tension is applied, often secondary to poor health, poor nutrition, or stress.

Tensile Strength: The ability of fiber to resist breaking when pulled upon.

Tipping: Trimming the tips of the fleece of an alpaca to ensure even length and high quality. This is often done to huacaya crias where the tips of their staples are prone to adhering to vegetable matter and easily breaking.

Top Knot: The fiber on an alpaca's head between its ears. Sometimes referred to as the wool cap

Topline: The top of the alpacas from the base of the neck to the beginning of the rump or croup.

Uniform Shearing: The complete removal of fleece from the entire body of the alpaca.

Uniformity: The degree of consistency in a fleece from one are of the blanket to another. Increased uniformity of fineness, uniformity of staple length, uniformity of character, uniformity of color are all valued traits.

Unsoundness: Physical disability that diminishes the function of a part of the body; also used to describe a fleece with tender breaks or matting.

Winging Out: As the alpaca walks, one or more feet swing outward, laterally away from the body, before being placed on the ground.

Withers: The highest point of the alpaca's back, adjacent to where the neck joins the topline.

Yearling: An alpaca that is between one and two years old.

Yield: The amount of processable fiber that is shorn from a particular alpaca.

THE YOUTH IMPACT FUND

The future of the alpaca industry depends on thoughtful education and responsible leadership. It begins by giving young people meaningful opportunities to learn, grow, and engage with alpacas in real-world settings.

The National Alpaca Foundation's Youth Impact Fund supports expert-led programs that provide hands-on experience, practical skill development, and access to knowledgeable mentors. These opportunities help young people build confidence, deepen their understanding of alpaca care, and learn industry best practices.

Your support helps prepare the next generation to lead with integrity and ensures a strong, informed, and sustainable future for alpaca ownership.

National Alpaca Foundation

www.NationalAlpacaFoundation.org

ALPACA Owners Association Inc

402.437.8484
www.AlpacaInfo.com