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Llamas and Alpacas on the Farm

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Llamas or alpacas can be a good addition to a farm or ranch—an alternative livestock enterprise on marginal pastureland that fits well into a diversified farming operation. This publication discusses considerations for raising llamas and alpacas, including regulations, marketing, nutrition, care, reproduction, and handling.

Social animals. Photo: Courtesy of Robin Alpert

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Introduction

Llamas or alpacas can be a good addition to a farm or ranch—alpacas as an alternative livestock enterprise and llamas as guard animals or recreational animals. They fit well into a diversified farming operation. Marginal pastureland is suitable for raising llamas and alpacas, with some supplemental feeding under certain conditions. There are currently more than 158,000 (SCLA, 2009) llamas and more than 170,000 registered alpacas in North America (Berman, 2011).

Both llamas and alpacas are members of the *Camelidae* family. Modified ruminants with a three-compartment stomach, they have cloven hooves and chew a cud like sheep and cattle. The young of both llamas and alpacas are called crias. Although they were previously classified under the same genus as llamas, the alpaca genus was changed from lama to vicugna in 2001 following genetic analysis showing that the alpaca descends from the vicuña, not the guanaco (Kadwell et al., 2001). Other members of the family, guanaco and vicuña, are wild animals classed as endangered species and protected from hunting in South America.

The llama and alpaca have been domesticated in South America for many centuries. There the llama is used as a beast of burden, as a fiber source, and as a meat source. The alpaca is used primarily for fiber production but is also a meat source in South America.

Llamas and alpacas are quiet, intelligent, easily trained animals that can provide fleece and potentially a variety of services to the owner. They are adaptable to different climates and terrains. Alpacas and llamas offer a comparatively

low-impact livestock alternative. Their padded feet do not have the same effect on the ground as hooves. In addition, they have efficient digestive systems and tend to consolidate feces, helping to control parasites and ease manure collection.

Before starting a llama or alpaca enterprise, it is advisable to visit as many existing llama or alpaca operations as possible, to pick up ideas and learn about options. Pay particular attention to regional farms because care and feeding may vary in different parts of the country due to climate, parasites, and terrain. Each llama or alpaca operation is unique. Gathering many ideas will help in creating an operation that suits a producer's particular situation.

Previously, when starting to raise either alpacas or llamas, the initial capital investment in breeding stock was fairly substantial. Though stock can still be expensive, since the mid-1990s the price of most llamas has been reasonable, and the price of alpacas has decreased as their numbers in the United States have grown. Raising llamas or alpacas is considered a high-risk enterprise by banks and other agencies and, consequently, a large owner investment is usually needed to obtain a loan.

As with any agricultural business, there are potential tax advantages associated with llama and alpaca production. If the animals are actively raised for profit by the owner, expenses such as food and veterinary care can be written off. Alpacas are classed as livestock, which enables farmers to operate under agricultural business rules. According to the Alpaca Owners and Breeders Association, there may also be tax benefits for passive owners who invest in alpacas (AOBA, no date). Llama and alpaca owners should stay current on tax law changes.

Related ATTRA Publications
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Meeting the Nutritional Needs of Ruminants on Pasture

Pastures: Sustainable Management

Rotational Grazing

Paddock Design, Fencing and Water Systems for Controlled Grazing

Regulations for Llamas and Alpacas

Before considering a camelid operation, find out whether any permits or licenses are required for raising llamas or alpacas in your state. The USDA Animal and Plant Health Inspection Service website links to states' and U.S. territories' import regulations for animals and contact information for state veterinarians. www.aphis.usda.gov/import_export/animals/animal_import/animal_imports_states.shtml

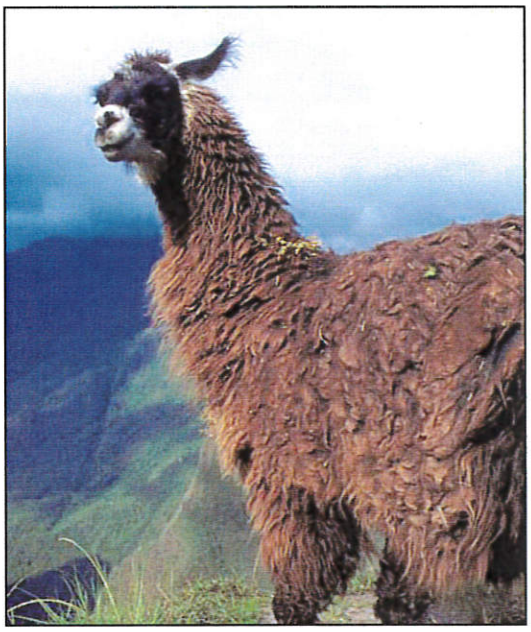
The property where llamas or alpacas will reside must be zoned for livestock. Check with your zoning authority before you purchase any animals. In addition, note that transporting llamas or alpacas across state lines can require considerable paperwork, testing, and vaccinations. Consult with your veterinarian or your state veterinary office for rules and requirements on interstate transport of llamas and alpacas.

Llamas

Llamas were first domesticated 4,000 to 5,000 years ago in the Andean Highlands. Many prominent people, including William Randolph Hearst, imported llamas to the United States in the late 1800s and early 1900s.

Typical weight of adult llamas can range from about 250 to 450 pounds. Their height at the shoulder is 42 to 45 inches, and at the head from 5 1/2 to over 6 feet tall. Llamas can live 20 to 25 years. They come in a wide array of colors from white to black, with shades of grey, brown, and red in between. They range from one solid color to various patterns and spots. There are different types of llamas: the wooly llama, the classic llama, the suri llama, and the silky llama.

Llama prices vary regionally, with pet-quality animals costing as little as $500. Prices depend upon the age, sex of the animal (males usually cost less), quality of breeding or show stock, and bloodlines. The low end of the female price range is $2,000 (SCLA, 2009).



Llama. Photo: www.clipart.com

Llama. Photo: Courtesy of Robin Alpert

Llama owners need to consider which of the creature's multiple uses will fit with their goals. Llama owners who plan to market breeding llamas will probably need to get pedigreed stock. For more information on pedigrees and registering llamas, contact the International Lama Registry, www.lamaregistry.com.

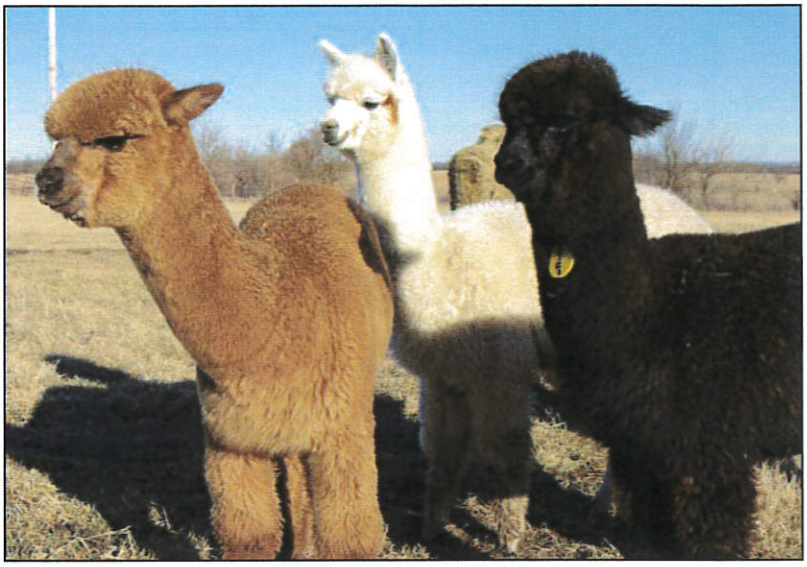
Alpacas

The alpaca was first imported to the United States in 1984. The majority of alpacas reside in South America, with growing herds in North America, Australia, New Zealand, and Europe. There are two types of alpacas, the huacaya and the suri.

Huacaya is the most common variety of alpaca. The fiber of huacaya alpacas grows perpendicular to the body. It forms a lock structure that surrounds the body with fiber, giving the animal a fluffy, spongy appearance.

Suri is a less-common variety of alpaca. The fiber of suri alpacas grows parallel to the body and hangs down the sides of the body in curly ringlets. Suri fiber doesn't stand out from the body, but parts along the backbone and hangs along the sides, giving the animal a slender, sleek look (Dey, 1998). Suri alpacas have five defined lock structures. These different types of fiber are listed on the Suri Network website www.surinetwork.org, along with the suri alpaca breed standard.

Suri alpaca. Photo: Courtesy of Robin Alpert



Huacaya alpacas. Photo: Courtesy of Robin Alpert

Adult alpacas typically weigh between 130 and 200 pounds. Their height at the withers averages 36 inches (Berman, 2011). The alpaca's lifespan is similar to that of a llama, averaging 15 to 25 years. There are 22 natural basic colors of alpacas ranging from black to white—including many different browns, grays, tans, and creams. Alpacas tend to be a single, uniform color, but occasionally will have white markings on the face, neck, or legs.

The price range for alpacas, like llamas, depends on color, coat type, sex, and other variables. Pets and fiber males sell for a few hundred dollars. Female production alpacas generally sell for $1,000 to $8,000, whereas breeding stock and show animals sell for thousands to tens of thousands of dollars. Though the North American alpaca industry used to focus primarily on breeding, it is now both a breeding and fiber industry (Berman, 2011). Alpaca producers getting into marketing of breeding stock should purchase registered and blood-typed stock. Contact the Alpaca Owners and Breeders Association, the Suri Network, the Cottage Industry Alpacas Breeders Association, or the Alpaca Registry, Inc., listed in the Further Resources section, for more information on registered alpacas.

Marketing Animals and Products

Fiber

Llamas and alpacas can provide two direct sources of income: fiber and live sales. Live-sale uses for

Shearing fiber. Photo: Courtesy of Robin Alpert

Alpaca scarves. Photo: Courtesy of Robin Alpert

llamas can include breeding stock, fiber-producing stock, pack animals, cart-pulling animals, golf caddies, companion pets, animals for pet therapy programs for nursing homes and schools, and guardians for alpacas, sheep, or goats. Live-sale uses for alpacas are mainly breeding stock or fiber-producing stock, though they also make good therapy animals.

Llamas are usually shorn annually and have a double-hair coat consisting of a fine wool fiber intermingled with stiff guard hairs. The guard hairs can be left in when making rugs and ropes. But before spinners and weavers can use the 4- to 7-inch-long llama fiber for knitting and weaving other products, the guard hairs have to be removed.

Handpainted Sock Yarn, 80 percent alpaca, 20 percent merino blend. Photo: Courtesy of Leah Reynolds

Alpacas are raised to be fiber-producing animals. They are usually shorn annually and produce between 50 and 90 ounces of first-quality fiber and 50 to 100 ounces of second- and third-quality fiber, though some animals may exceed these levels (Berman, 2011). Because alpacas have been bred as fiber animals, they should naturally not have many guard hairs mixed in their fiber. World market price for alpaca fiber ranges from $2 to $10 per pound. Only the highest grades of fiber, finer than 20 microns in diameter, will command higher prices. Each stage of processing, including cleaning, carding, spinning, knitting, and finishing, adds value. A finished garment may sell for $10 per ounce, and hand-knit garments have sold for as much as $1,000 (Berman, 2011).

The alpaca community is working to build both commercial and cottage industries for alpaca fiber as the national herd grows. Commercial fiber processors prefer white fiber, but there is a niche market for colored fiber within the cottage industry. Fiber artists enjoy working with naturally colored fiber because it does not require the added step of dying. Producers should be aware, however, that developing the potential of this niche fiber market requires time and effort.

Some positive aspects of alpaca fiber are its softness, uniform fineness, resilience, and thermal capacity. Alpaca fiber provides warmth despite its light weight. Spinners, weavers, and knitters use the fiber for fine textiles. The sheared fiber from one alpaca is usually enough to make four to six sweaters (Altizio and Westendorf, 1998). There is an application for every grade of alpaca fiber, but the clothing grades, 14 through 25 microns, are

in the highest demand. Since neither alpacas nor llamas produce lanolin, the fiber does not need to be scoured before it can be spun.

A growing trend in the llama and alpaca industry is the fiber CSA (community supported agriculture). A CSA allows consumers to purchase shares directly from a farmer, who can then approach the growing season with confidence based on this influx of cash. Though the number of fiber CSAs is not large, the CSA fiber market is gaining popularity due to increased demand on the part of craftspeople.

In return for purchasing a share in a fiber CSA, consumers receive raw fiber, processed batts, roving, or yarn. Shares are generally sold before spring or fall shearing, and range in price from $100 to $180. Some producers are very specific regarding what the shareholder can expect to receive, whereas others indicate that the share will vary depending upon the size of the clip (Bird, 2009).

Pack Animals

The history of the llama as a pack animal began about 5,000 years ago with the natives of South America, who found llama packing to be the ideal way of transporting goods through rugged terrain. A robust llama can pack 25 to 30 percent of its body weight, or 70 to 95 pounds. Llamas are sure-footed in the most difficult terrain and have a low impact on trails compared to traditional pack animals. They usually obtain adequate food and water from browsing while walking, though harsher environments will require the packer to bring additional food and water. Pack llamas are used by a variety of professions, including hunters, fishermen, government land management, rescue work, trail maintenance crews, and scientists transporting delicate equipment into the field (RMLA, no date). Before packing, take care to understand how the saddle should be used, as well as the balance and weight appropriate for your animal. Llamas under the age of two should not be loaded, and no llama should be fully loaded until it is well-trained and fully matured (usually at four years of age) (Camelid Community, 2005).

Livestock Guardians

Llamas can also be used as guardians for livestock, including cattle, sheep, and poultry. As a herd animal, the llama is particularly attentive to menaces (Walker, 2003). Llamas are natural guardians due to their inherent wariness of the dog family. An

Alpaca booties. Photo: Courtesy of Leah Reynolds

Iowa State University study found that, on average, producers were losing 26 sheep, or 11 percent of their flock to predation, compared to eight sheep, or 1 percent, after obtaining guard llamas. Most guard llamas are gelded males, and can be kept with anywhere from four to over 2,000 sheep. Many of the llamas in the study adjusted to the livestock within a few hours, and 80 percent were adjusted within a week (University Extension, 1994).

* * * * * * *

A consideration for many llama or alpaca farmers is that marketing opportunities are not readily available in their locations. Developing markets for their llama or alpaca operation can take a large amount of the operator's time and energy, and requires good "people skills" and a business plan.

Marketing of llamas and alpacas on the Internet is an option with both advantages and challenges that need to be considered. Producers considering marketing over the Internet should consult the Access Minnesota Main Street website www.access-ecom.info/index.cfm?xid=MN, which has an Electronic Commerce Curriculum that provides information on electronic commerce basics; finding business information and services online; exploring E-commerce websites; creating your website; promoting your website; Minnesota case studies; developing your Internet business plan; and much more.

While raising llamas or alpacas presents an alluring and fulfilling lifestyle with profit potential, prospective farmers must understand the seriousness of the investment, including high initial costs, as well as the fact that profit is not a guarantee. Some farmers feel that there is not a

viable fiber market in the United States at this point, and experience a challenge in selling their fiber (AlpacaNation, no date). One study found that today's prices for alpaca breeding stock are unsustainably high because fiber prices will never reach correspondingly high levels. If fiber prices improve due to increased demand, the study projects that supplies will increase and prices will drop again (Saitone and Sexton, 2005). These considerations should serve as a caution or preparation for those who are considering entering the llama and alpaca industry.

Nutrition

Llama and alpaca production practices are similar to those for sheep. Water needs to be accessible at all times. Llamas and alpacas are adaptive feeders, eating grasses, forbs, shrubs, and trees. They can be kept on a variety of pastures and hay. Approximately three to five llamas or five to 10 alpacas can be grazed per acre, depending on the quality of the pasture. A bale of hay will generally feed an adult llama for a week. Because of the animals' high feed conversion, hays with high protein,

Table 1: Camelid Dietary Factors

Energy	• Main source is pasture and forage • Cereal grains may be supplemented as a high-energy feed in certain circumstances (e.g., late gestation, early lactation, weaning, work, etc.), though camelids generally thrive with minimal or no grain • Grass hays are better than alfalfa hays; alfalfa can result in hypercalcium
Protein	• Relatively low requirement: diet of 8 to10 percent crude protein for maintenance, 12 to 14 percent for growing stages, late gestation, or early lactation (RMLA) • Crias have a higher requirement of roughly 16 percent • Note that, in general, alfalfa hay contains 20 percent crude protein and grass hay contains 12 percent
Fiber	• Camelids require 25 percent or more of crude fiber, of which forage is the main source • Lack of fiber can reduce gastric performance and correlates with gastric and duodenal ulcers
Water	• Fresh, clean water should be available at all times • Water testing is highly recommended, as contaminants can affect animal health (RMLA)
Salt	• Should be offered free choice in a container in a sheltered area • Should be iodized (excepting areas where iodine deficiency is known not to be an issue)
Calcium and Phosphorous	• Balanced daily intake is important, especially for young animals and adult reproduction • A ratio of 1.2:2.1 of calcium to phosphorous is sufficient • Cereal grains usually provide sufficient phosphorous unless from phosphorous-deficient soils
Vitamins	• Properly cured hay normally has sufficient A and K vitamins • Camelids generally get enough sunlight for Vitamin D; however, in northern latitudes or during winter months they may not acquire sufficient sunlight, subsequently developing rickets • Vitamin-mineral mixes will cover deficiencies • Vitamin E is quickly lost in cured forages and should be supplemented • Care is required when supplementing Vitamin A, as it is cumulative
Trace Minerals	• Selenium, zinc, magnesium, cobalt, and copper are significant dietary factors • Trace minerals may be added to a salt container • The copper (Cu) to molybdenum (Mo) ration should be 6:10.1 • Sulfur levels in excess of 2000 mg/kg can result in a copper deficiency • High levels of zinc can suppress copper absorption • Knowing your land and water supply and which minerals are deficient or excessive is critical • It is imperative to consult a local veterinarian or county agent

Sources: Irbeck, 2000; Irbeck, no date; SCLA, 2008.

Note: Forage analysis is the best way to determine what nutrients are excessive or lacking in your pastures.

like alfalfa, are not recommended because the animals can easily become overweight (Dey, 1998). Rotational grazing of llamas and alpacas can help utilize the pasture to a greater extent. Using pastures to meet most of the nutritional needs of the animals will enhance profitability, because pasture is usually less costly than purchasing supplemental grains and hay.

Llama and alpaca owners need to be concerned about poisonous plants in their pasture or hay. Some plants can make the animals sick, and others can kill them. Many state Extension offices have regionally specific publications that can help animal owners identify and manage poisonous plants.

During periods of stress, animals should receive supplemental feeds, such as small alfalfa pellets, oats, or blended feed pellets specially formulated for llamas and alpacas. Be careful if feeding straight pelleted feed because llamas frequently choke on the pellets. If pellets are fed, they should be mixed with a coarse feed or spread out in a large pan. The producer may also put smooth rocks in the pan to keep the llamas from gobbling the pellets too fast (McGrath, 1996). If a rich diet is continuously fed, llamas and alpacas will become fat, causing reproduction problems varying from poor conception to poor milk production. Free access to salt, minerals (with selenium in a selenium-deficient area), and clean water is essential.

Physical and Social Environment

Llamas and alpacas must be provided with natural or manmade shelter with adequate ventilation and space so that they may escape from heat, cold, and precipitation. Depending on the climate, heating and cooling measures are also necessary (see the section on heat stress) (Camelid Community, 2005).

Fencing must be sufficient to contain the llamas and alpacas, as well as to keep predators out. Fences should be at least 48 inches high, though many producers recommend 60 inches, and no more than 12 inches from the ground. For those planning to raise llamas or alpacas, fencing predators out may be as important as fencing their stock in. Woven wire or electrified high-tensile fencing are some common choices. Use of barbed wire is not recommended. The animals must have freedom of movement and the ability to exercise in their enclosure. Note that llamas generally require more space than alpacas. Llamas and alpacas are grazing animals, and should be provided the opportunity to graze daily. Manure should be removed from the enclosure regularly, mud should be removed, and urine build-up should be treated to prevent parasites (Camelid Community, 2005).

Llamas and alpacas are herd animals and should never be kept alone. Furthermore, they should not be raised as a baby away from other camelids. Aggressive and territorial males may need to be in a separate enclosure, but they should remain within sight of the other animals (Camelid Community, 2005). A male alpaca or llama that exhibits extremely aggressive behavior towards other animals and humans is termed a berserk male. Although uncommon, berserk males cause havoc in the herd, present a serious danger to humans, and are not retrainable (Paul, 2007). Gelding can usually reduce or relieve this behavior.

Animal Care

It is advisable to seek a veterinarian's advice or contact breed associations in your area for preventative health suggestions, specific nutritional requirements, or special problems prevalent in your area. Work with your veterinarian to determine what vaccination schedule is necessary to protect your animals from local disease risks. If you need to find a veterinarian, the American Association of Small Ruminant Practitioners (www.aasrp.org) offers listings of veterinarians who work with camelids. Below are descriptions of some common health concerns, including heat stress, meningeal worm, toenail trimming, dental care, and shearing.

Because llamas and alpacas are from the dry, thin air in the high plains and mountains of South America, they are not acclimated to the high heat and humidity in many parts of the United States, and are in danger of heat stress. Use of the heat index is a common tool for determining when animals are at risk. The key to combating heat stress is prevention; there are many practices to protect llamas and alpacas. Providing shade is an easy step. Shade can be provided by either trees or shelters, but good ventilation of shade structures is essential. Proper husbandry is another preventative measure and includes working or handling animals during the coolest part of the day, and planning for crias to be born in the spring. Shearing helps animals lose heat effectively and is one of the most important aspects of

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heat-stress prevention. In addition, proper nutrition can increase the animals' resistance to environmental extremes.

Access to fresh water also helps prevent heat stress. Water should be kept in the shade, and electrolytes may be added if necessary. Another consideration is providing water for llamas to wade in, whether in the form of a pond, stream, or baby pool. Sand pits or concrete floors will also suffice as cooling areas. Finally, of utmost importance is monitoring for signs of heat stress, which include nasal flaring, open-mouthed breathing, increased breathing rate, drooling, depression, and loss of appetite. If these signs are observed, the first step is to cool the animal down by hosing, removal to a cool area, or placement in shade or water, and then call a veterinarian (Free and Anderson, 2003).

Llamas and alpacas are vulnerable to common internal and external parasites. One of the most deadly is the meningeal worm, or *Parelophostrongylus tenuis,* which causes neurological disease characterized by lameness, lack of coordination, inability to get up, paralysis, circling, and blindness, and can result in death (Duncan and White, 2000). Death may occur in just a few days, or ataxia may last for months or years. White-tailed deer are a natural host for the parasite, so areas with high concentrations of deer are at higher risk of meningeal worm (Durkes and Burcham, 2008). Preventative measures include exclusion of deer through the use of deer-proof fencing and removal of thick ground cover in pastures to control slugs and snails, which act as the intermediary host. Regular deworming with Ivermectin is often suggested, but this is controversial given the concern about the development of resistant gastrointestinal nematode populations (Duncan and White, 2000). A definitive diagnosis of meningeal worm can only be made postmortem, as it requires demonstration of *P. tenius* in the brain or spinal cord. The Baerman technique, which relies on detection of larvae in the feces, is the only antemortem diagnostic tool. However, this test is unreliable as hosts rarely shed larvae in their feces. Treatment of the parasite is difficult given the severity of the neurological symptoms, but Ivermectin and anti-inflammatory drugs are recommended (Durkes and Burcham, 2008). See ATTRA's *Managing Internal Parasites in Sheep and Goats* for more about internal parasites. Llamas and alpacas are affected by the same parasites as sheep and goats, and the principles of management are the same.

Correct alpaca bite. Photo: Courtesy of Robin Alpert

A physical assessment of each animal should be done at least twice a year and should include weight or body score, mucous membrane color check, condition of incisors, and fiber coat evaluation. A detailed health assessment, such as fecal or blood analysis, or a veterinary exam, may be necessary if weight loss, pale color, or clumped stool is observed. Conversely, a review of diet and activity is necessary in the event of excessive weight gain (Camelid Community, 2005).

Toenail trimming is a vital aspect of camelid care. Though toenails often wear down naturally with sufficient exercise, when the nails do not wear evenly trimming is necessary for stability, locomotion, and long-term joint health. Overgrowth of toenails, the most prominent disorder of the camelid foot, may result in the nail being pushed out of its normal position or curving in various directions. Nails should be trimmed to keep toes in proper alignment. An ideal trimming time is when the animals are being processed for shearing. Nails can be trimmed using rose or shrub nippers, sheep nail trimmers, a hoof knife, primary shears, or equine hoof nippers. Confinement in a chute or gradual familiarization of the animals to having their feet handled may be helpful (Ault and Anderson, 2003).

Llama and alpaca producers will also need to undertake dental care. Of particular concern are the fighting teeth, which generally erupt at two and a half years of age. Fighting teeth rarely need

to be removed from females or even studs, unless two or more males are kept together. If fighting teeth are not removed, the males could seriously injure one another. Fighting teeth can be surgically removed by a veterinarian or by the owner. Most animals are unthreatened and don't experience pain through this procedure. The llama must be restrained during cutting to keep its head steady. Cutting requires two people: one to hold the mouth open and the other to cut. The holder should wear gloves and both people should wear safety glasses. A 1½- to 2-foot long piece of obstetrical wire is sufficient for cutting. The person doing the sawing should pass a loop of the wire around the tooth and make one or two quick pulls to make a groove. The rest of the sawing should be simple, and the tooth should come off in a matter of seconds. Finally, the remaining tooth stub may need to be filed if it is sharp (Hoffman and Asmus, 2005).

Shearing is an important consideration for llamas and alpacas whose primary purpose is fiber production. Llamas used for other purposes may not require annual shearing. Shearing frequency depends on both the climate and the individual animal's fleece characteristics. How close to shear also depends on the climate and on the animal's skin color. A light-skinned animal with too short of a coat is vulnerable to sunburn.

Fiber quality is determined in part by the animal's environment. Keep pastures free of burrs and weed seeds and avoid using sawdust and woodchips as bedding. Before shearing, the animal should be dry, clean, and acclimated to the shearing process. Shearing can be done with hand or electric shears, and the fiber should be collected separately by coarseness, length, and color. Skirting, or the removal of unwanted matter and fiber, ensures the uniformity of the fiber and reduces shipping costs. Fiber should be stored in a cool, dry environment until processing. Fiber may be sold raw, though processing adds value. Home processing can include washing, carding, spinning, and creating a finished product. Other processing options include mills and fiber co-ops (The Camelid Community, 2010).

Before anyone (new or established llama or alpaca producer) buys a llama or alpaca, the buyer should check out the seller's herd and make sure the animals look healthy, well fed, and well treated. The buyer must ask questions of the seller and learn as much as possible about the animal's health, diseases, and parasites. The buyer needs to ask about health records, breeding programs, origin of the seller's stock, proof of health tests, and status of the herd, as well as other questions needed to determine that the seller is knowledgeable.

Reproduction

Female llamas and alpacas begin ovarian activity at six to eight months of age. Females should not be bred until 18 months and until they have a weight of at least 88 pounds (40 kilograms) for alpacas and 198 pounds (90 kilograms) for llamas. The gestation period for both llamas and alpacas is 342 days, plus or minus 10 days. Seventy percent of births occur in mid morning or late afternoon. Most males enter breeding programs at 18 to 24 months of age, and most are fertile by 30 months of age. Male alpacas may reach sexual maturity before male llamas (Merck & Co., Inc., 2008).

Llamas and alpacas are induced ovulators, meaning mating precedes the egg, not the other way around. The animals mate lying down, for an extended period of 15 to 45 minutes. The female should be tested for pregnancy at two to three weeks, six weeks, and 12 weeks after mating. It is not recommended to leave the male and female together at all times.

Baby llamas and alpacas, or crias, weigh 12 to 17 pounds (5.5 to 8 kilograms) and 24 to 35 pounds (11 to 16 kilograms), respectively (Merck & Co. Inc., 2011). Crias should remain with their mother until at least four months of age, though

Llama birth. Photo: Courtesy of Robin Alpert

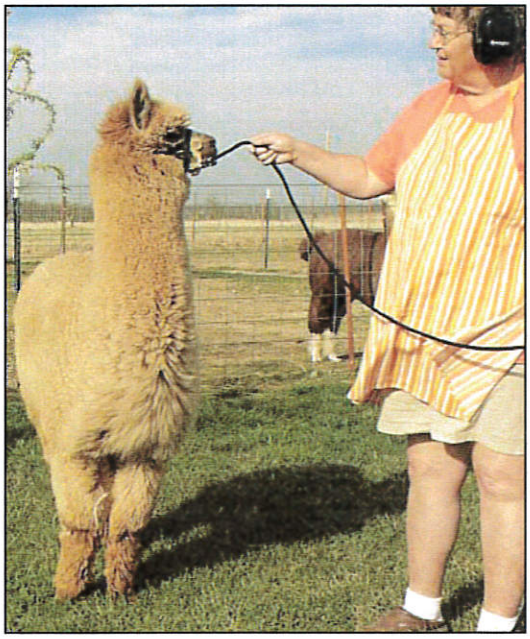
being together for six months is recommended to promote normal behavior and good nutrition (Camelid Community, 2005). Generally speaking, crias need very little human care or maintenance to thrive. The most important human intervention consists of keeping a careful watch at birthing, treating the umbilical cord with iodine compound, and ensuring that the cria's airways are clear. After birth, make sure the cria gets enough colostrum in the first two days, and an adequate milk supply in the following weeks. (Watt, no date). Do not bottle feed crias unless medically necessary, and then only in a herd environment (Camelid Community, 2005).

Handling and Transport

Llamas and alpacas are easy to train.

Proper handling of llamas and alpacas is necessary for the safety of both the animals and people. When using halters, they should be fitted such that the nosepiece allows room for chewing but cannot slide down and hinder breathing. Improperly fitted halters can be fatal. The nose bands of properly fitted halters should sit just below the animal's eyes, and the head band should sit right at the base of the ears (McGee, no date).

Be careful not to leave halters on all the time, and don't tie animals to any stationary object, such as a tree or post. Llamas and alpacas can break their necks trying to get away or by jerking their heads. If you have to tie the animal up and leave it unattended, always use a bungee or other elastic extension (McGrath, 1996). Handlers should also avoid wrapping a lead rope around their hand or body, as serious injury could result if the animal takes flight.



Huacaya alpaca on lead. Photo: Courtesy of Robin Alpert

For contact with the public, only use llamas and alpacas that are accustomed to and behave appropriately with people. Spitting is part of the body language of llamas and alpacas and is used to express displeasure, establish the social order of the herd, and respond to threats. Llamas and alpacas accustomed to people will generally not spit at humans (Camelid Community, 2005).

Llamas and alpacas are easy to train. To reduce stress during transportation, llamas and alpacas should be trained to halter, lead, and load into a transport vehicle. In just a few training sessions, llamas can learn to pull a cart or carry a pack, a lightweight rider, or golf bags. (Note that alpacas should not be used for carrying riders or packing as they lack the skeletal structure for these activities) (Berman, 2011).

For herd management purposes, including training, llama brushing, nail-trimming, etc., a restraining chute or small corral is necessary. Portable chutes designed for llamas and alpacas are commercially available or can be owner-built using wooden posts and two fence poles for each side. It may also be beneficial to have holding pens or small pastures so that the animals can be held temporarily without being confined in a small space (Goldsmith, 1996).

Take care when transporting llamas or alpacas during extreme weather. The vehicle must be well-ventilated, and animals should be checked for signs of heat stress or hypothermia at regular intervals. Llamas and alpacas should not be tied during transport, as this can result in serious injury or death (Camelid Community, 2005).

Acknowledgements

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Further Resources

Websites

Alpaca Owners and Breeders Association
www.alpacainfo.com

Alpaca Registry Inc.
www.alpacaregistry.com

American Association of Small Ruminant Practitioners (AASRP) provides a forum for those with an interest in small ruminants. Members gain access to the most current research, products, and services.
www.aasrp.org

American Miniature Llama Association
www.miniaturellamas.com

APHIS Veterinary Services Area Offices
www.aphis.usda.gov/animal_health/area_offices

CAL-ILA
www.cal-ila.org

Cottage Industry Alpaca Breeders Association
www.ciaba.org

International Lama Registry (ILR) is the only U.S. registration organization for all four types of lamas. Contact the ILR for any questions regarding registration of llamas and alpacas, or for references to lama breeders in a specific area. Information is also available on their website.
www.lamaregistry.com

Rocky Mountain Llama and Alpaca Association
www.rmla.com

South Central Llama Association
www.scla.us

Suri Network
www.surinetwork.org

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Magazines

Llama Life II News Magazine
5232 Blenheim Road
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434-286-4494
www.llamalife.com
A quarterly publication that serves as the llama industry's publication of record.

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www.smallfarmtoday.com

Llamas and Alpacas on the Farm
By Lance Gegner
NCAT Agriculture Specialist
Published 2000
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Tracy Mumma, Editor
Amy Smith, Production

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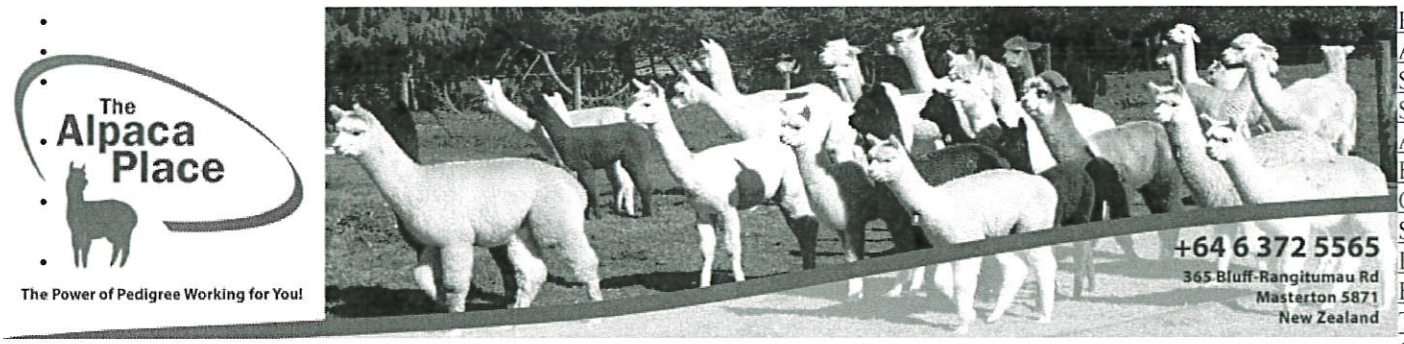
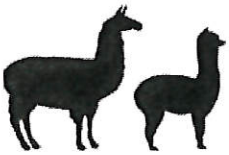


Frequently Asked Questions

What is the difference between alpacas and llamas?

Llamas are much bigger than alpacas, and have "banana" shaped ears. They are primarily used as a pack animal. An alpaca is principally used for fleece production, they are not suitable physically or temperamentally for freight carriage. They have a much better fleece quality than llamas, with a lot less guard hair. In New Zealand, alpacas are in more demand than llamas due to their beautiful fleece – call us to find out how you can benefit by owning these beautiful animals! In the silhouette below, the llama is on the left, the alpaca on the right.



What do you do with an alpaca?

That depends on personal choice!

- Alpacas are probably the optimum livestock investment in the world.
- Even small herds can be financially viable, making them ideal for hobby farmers or those with limited land space.
- Wethers make great pets for people who prefer the livestyle option and have no desire to commercially farm or breed their animals. They can be readily halter trained, and reward their owners with an annual fleece.
- Alpacas produce a luxurious fibre which can be shorn on an annual basis, and sold as either raw fleece, or manufactured in yarn or fabric. Alpaca textiles are recognised by fashion houses world-wide.

Why is buying alpacas a good use of my money?

- Alpacas are easy to farm and care for.
- Alpaca farming is a developing industry, the future is bright!

How many alpacas can be kept per acre?

Stocking rate is normally quoted as being similar to sheep (around 4-5 per acre) despite the size differential. Most owners are finding however, that alpacas eclectic diet and excellent food conversion means that stocking rates are 50% or more higher than for sheep (ie 6-9 per acre in New Zealand). Stocking rate can in any case be increased by good pasture management and fertilisation, and increased hay feeding of the alpacas.

You can keep a pair of wethers on as little as half acre. We started our alpaca farm on just over 2 acres, which enabled us to keep around 12 alpacas. We chose to move to a bigger property, and continue to expand, but this is not everyone's choice!

What do alpacas eat?

Alpacas are browsers who eat most varieties of plant life, including grass, foliage and palatable herbs. They have a split upper lip (like a rabbit) which enables them to cleverly nibble around long and sharp thorns. Their diet is similar to a goat, although they chew their cud like a cow, and their digestive system is somewhere between a horse and a cow. In addition to green plants and grass, they enjoy meadow and lucerne hay, and also concentrates in the form of alpaca nuts, now available commercially (but which should be limited to 1/2 a cup per day). Do not feed alpacas any form of grain or grain based foods including multi nuts, horse nuts, pig nuts or bread – eating grain based foods can lead to ulcers and possible death. Because they have developed in harsh Andean conditions, they do make excellent use of their feed, and can thrive on poorer pasture than most farm stock.

Do alpacas require special fencing?

No. Normal farm fencing, whether wire-and-batten or sheep mesh is fine. Deer fencing is often used, but is not necessary – alpacas can jump, but not that high! Studs (machos) sometimes need slightly higher fencing to deter them from attempting to get to the object of their desire, but nothing like the height of a deer fence! There is now camelid mesh fencing available – higher than standard fencing and lower than deer fencing, however most alpaca farms still use standard height sheep fencing. Alpacas do not lean or push on fences as do other animals, nor do they tend to put their heads through fencing in search of greener grass! Electric fencing and barbed wire is not required, and not recommended because both can cause injury to your alpacas. In particular, electrified tape has caused a number of deaths in alpaca: they reach a long way under the tape with their long necks, then lift their head and turn: next thing the tape is wound right around their neck and they are repeatedly shocked until they die. This is an horrific death, and totally needless as alpacas will not challenge the poorest of fences.

Are alpacas easy to care for?

Very! Compared to other stock species, alpacas are very low maintenance. Basic care includes annual shearing, toenail trimming 3-4 times annually, annual vaccination, worming, and bi-monthly drenching with vitamins A,D&E.. They should have a daily visual check, periodic body scoring and need supplementary hay feeding in winter. These are maintenance issues common to all farm stock. Also in common with other stock species, they are prone to Rye Grass Staggers (which is preventable), and Facial Eczema (the risk can be reduced).

- They are do not suffer from bloat, footrot or flystrike.
- TB testing is not compulsory in New Zealand.
- They do not need tail docking or crutching.
- They are not large, strong, heavy, dangerous or difficult to herd and control.

How do you transport alpacas?

In a horse truck or float, or a covered trailer. Alpaca trailers have now been designed for alpacas, ideal but expensive. Open stock crates are unsuitable – alpacas do not tolerate cold winds or draughts well, and the wind effect created by a moving open trailer is freezing! Alpacas almost always "cush" (sit down) when in a moving vehicle, so they are very stable to tow. You can also transport alpacas in vans that have been adapted for that purpose.

Are alpacas intelligent?

Yes. Alpacas learn very quickly, and have long memories. They recognise other alpacas they have been close to, even if they have been separated for several years. They seldom forget something they have learnt, either! They are intensely curious animals, and take a lot of interest in the actions of other animals and people.

What sound does an alpaca make?

A gentle hum that can be used to express a variety of emotions, from curiosity to interest to anxiety. They have a piercing alarm whistle that is quite distinctive, but seldom heard. The boys have their own unique 'love song' – an orgle – when they are wooing their girl. And the wee cria click their tongue when talking to their Mum – its very cute! Generally alpacas are very quiet animals!

Are alpacas dangerous?

No. Alpacas are very gentle creatures. Their first form of defence is to spit. This is unpleasant, but hardly dangerous! They will kick, but with a soft foot pad, and lacking substantial muscular development, this also is more likely to be unpleasant rather than painful.

The only exception to this is an"over-humanised" alpaca that is unable to distinguish the normal boundaries that exist between species resulting in aggression by the alpaca. This is not a naturally occurring syndrome, but one which is created by inappropriate handling by owners. Correct handling as a cria will prevent this. It is impossible to cure.

How many alpacas do I need?

A minimum of two adults – although three is preferable. Alpacas are highly socialised and suffer mental and emotional – even physical – deprivation if kept in solitary confinement. The company of other animal species is not sufficient, they need other alpacas. A reputable and caring breeder should refuse to sell you less than two alpacas as a starting herd. Call us to find out some of the options for a starter herd.

What use is a wether?

Wethers make great pets! They can be taught to lead and there are even pet alpaca performance classes at some A&P shows. If you want to own alpacas, but have either time, space or budget restrictions, wethers are a low-cost option that lets you have all the pleasures of owning alpacas without the responsibilities of being a breeder. If you have only a small acreage, having two or three wethers means you don't have to worry about running out of grazing or space, nor have the emotional anguish of having to sell animals you are fond of, just because you have run out of space. If your interest is in fibre, rather than breeding, having a wether herd gives you an annual supply of fleece for your own use , plus the pleasure of owning these sweet and attractive animals.

When buying a starter flock for breeding, buying a wether for company for a breeding female keeps down the initial cost of starting up your new business. Even when you have an established herd, having a wether is still useful – he can be used as a Public Relations animal (intact males have their minds on other matters, and females can become stressed if taken away from familiar surroundings with a cria, or when heavily pregnant). If you need to separate one animal from the herd or to transport a female for breeding take your wether along also! Pop a wether in with young stock at weaning time – babies like the reassuring company of adults. Wethers can safely be kept in with your breeding females without any risk of an undesirable pregnancy. Whatever way you look, wethers are a good investment choice!

Wethers will provide you with a fleece every year, some of very high quality. If you are a hand-spinner, spinning alpaca fibre will give you a luxurious yarn, and it is no harder to spin than sheep's wool. Light coloured alpaca can be readily dyed, or if you prefer natural colours, buy a coloured alpaca! If you are not interested in spinning your own, there are commercial spinners who can turn your fibre into yarn ready for you to knit or spin, or you can simply sell the unprocessed fleece. When you buy your alpaca from The Alpaca Place, we will make sure you are aware of your options.

Why should I buy alpacas?

There are alpacas to suit every dream – whether as gentle and attractive pets, or as fibre producers, or for hobby breeders who love having alpaca babies around, or for serious farmers and investors. If you have a lifestyle block or small farm, alpacas have to be the livestock of choice – they are easy to care for, have minimal health care, are easy on pasture and fencing, produce fleece annually, sale of surplus animals provides a lucrative return on investment, are gentle, physically unimposing, non-aggressive animals that are ideal for the novice animal handler, and they are viable to keep even on small acreage. When you purchase from The Alpaca Place, we will train you how to handle these gentle animals in a manner that keeps them easy to catch and handle. Book your farm visit today to see for yourself how owning alpacas will improve your lifestyle choice!

What sort of land is best for an alpaca?

Alpacas can thrive on all types of land. They are very good converters of food to energy, and do not require lush pastures or fertile soils. They enjoy running on hills, but can be equally at home on flat pasture. Alpacas are being successfully farmed in New Zealand from the far North to Southland. Their versatility also see them flourishing internationally in lands as diverse as Australia, Japan, the UK, and USA and Europe

What is the negative side of owning alpacas?

The high cost of purchasing your initial breeding stock. However, once you have overcome this hurdle, it becomes much easier to obtain subsequent females, as you will breed some of your own, or be able, over time, to sell a few wethers which will give you a substantial part of a purchase price for another female.

Do alpacas have any other uses besides fibre?

In South America, alpacas are used for meat, as well as shorn for fibre. However, in the Western world, alpacas are not routinely slaughtered for human consumption. Alpacas have proven, that with appropriate care, they can continue to produce cria right up to their late teens, or early twenties, making breeding females far too valuable to eat. The high return available by breeding alpacas makes reproduction the major use of alpacas at this time. For owners of small blocks of land who require some form of livestock to keep vegetation under control, the alpaca has no peer! They are gentle and easy to handle, their care is largely trouble-free, they are not hard on pasture, nor are they rough on fencing. The value of alpacas as pets should also not be under-rated. They can be readily tamed and trained to become personable pets that owners can be proud of, and are exotic enough to provide you with a pet that will be the envy of your friends and neighbours!

Are there any special terms for alpacas?

Males are termed **machos,** females are called **hembra**, unweaned babies are known as cria and yearlings are known as **tui**. A castrated, or gelded, male is a **wether**. In fact, only the terms "cria" and "wether" are in common usage in New Zealand, males are more often called studs, and hembras generally termed females. As tui is the name of a native bird in New Zealand this term is not used for yearling alpacas here.

How long do alpacas live for?

Alpacas can live well past 20 years of age, and will breed for most of those! Most females can produce 10 – 12 cria in a lifetime, repaying your investment over and over again.

At what age do alpacas start breeding?

It used to be common for females to be mated at just 12 months, although experience has proved that 18 – 24 months is a better age when the females are more mature. Males generally do not start breeding until they are 2-3 years old.

How long are females pregnant for?

Around 11 ½ months, although it is not uncommon for birth to occur a few weeks early, or to be 4-6 weeks overdue!

How do you shear alpacas?

Alpacas are shorn restrained in a prone position on the ground, or on a specially designed "shearing table". Once one side has been shorn, they are rolled over and the other side is shorn. The same shearing equipment is used as for sheep, and they can be either blade (manually) shorn, or electric shears can be used.

Can you run alpacas with other animals?

Alpaca are gentle and non-aggressive. They are never a threat to other pastoral species. However, because of their relative lack of strength and defensive ability, care should be taken when stocking them in the same pasture as other animals. Sheep are fine, but cattle tend to be too big and boisterous, and even a quiet horse can deliver a powerful kick when startled. We have no personal experience with goats and deer, however feel that a good rule of thumb when considering cross grazing alpacas with other species, is to keep your alpacas in a separate paddock to the others.

Do alpacas have twins?

Twins are occasionally conceived, but only rarely survive. A foetus usually develops in the larger of two uterine horns. When twins are conceived the second foetus will usually develop in the smaller uterine horn, but in many cases there simply isn't room for two developing foetuses, which will abort prematurely.

When do alpacas have their cria?

Normally late morning to mid afternoon, and most often on a warm, sunny day. However, on occasion, alpacas will be born on a cold or rainy day, or outside the mid-day time window, so always keep a close eye on your alpaca. An alpaca who is still in labour late afternoon or evening is often in trouble – be prepared to call your vet!

How do you round alpacas up?

If you have properly handled alpacas you should be able to call them into a catch pen, or new field. Leading a well-trained animal on a halter is much easier than attempting to push or pull your alpaca around! However, sometimes you will need to herd alpacas, and this is best achieved by two or three people. Simply walk behind the animals in the direction you wish them to move, preferably using a training wand or similar. A rope held between two people is very effective! Shepherd dogs cannot be used for herding as alpacas do not respond to these as sheep and cattle do. Training in how to herd your alpacas is part of the on-going support offered by The Alpaca Place to its customers.

Can you keep male and female alpacas together?

No. You can keep most males together, females together, wethers together or in company with females and most males. However, a pregnant female wants nothing to do with an entire male, who will pester them in the hopes they might be receptive.

Do you need to keep alpacas indoors in winter?

Not in New Zealand! If you live in area prone to snow, you may need to build a shelter shed, but be prepared to lock your alpacas in as they seldom seek this type of protection! An alpaca's natural environment is very harsh, and they can cope with most cold and wet conditions. They

are susceptible to cold winds, so windbreaks are essential. They suffer more from heat in summer than cold in winter, so shade from the sun is also essential.

How easy is it to find a Vet who is experienced in the care of alpacas?

Its becoming easier! Many vets have minimal experience with camelids, but more and more are taking an interest in camelids. However, finding a vet who is ready to admit their lack of experience and then do research, consult other veterinary professionals, and listen to you as the person with "hands on" experience, and you will probably receive very good care for your alpaca. By the very nature of the profession they have chosen, most vets are interested in animals and more than happy to increase their knowledge base. Beware the vet who will not listen to you, who assumes you know nothing because you are not qualified, or who tries to give the impression they are more experienced than they actually are – find another vet! If you can, talk to other alpaca owners in your area, and see if they will recommend a vet. It may be worth paying a little extra in travel costs to obtain the services of a competent and interested vet. New Zealand's Massey University has increased the camelid training veterinary students receive, so finding vets experienced in alpaca care is becoming easier.

What are the Veterinary & Medical costs associated with alpacas?

Very low – most owners can learn to do basic medical care such as drenching, vaccinations and toenail trimming themselves – and this training is included in the support package offered by The Alpaca Place. Most cria are born without assistance on sunny days. Wethers must be castrated by a vet under either general or local anaesthetic. In fact, many veterinary costs are incurred voluntarily by the owner, if they do not want to undertake basic care themselves, or want a pregnancy confirmed by bloodtest or ultrascan. Alpacas are very healthy animals, and many problems can be averted by proper care – see our "Health and Welfare" pages.

Are alpacas prone to any diseases?

Facial eczema, rye grass staggers, phosphate and vitamin D deficiency, are conditions that alpacas have been identified as being susceptible to. These are conditions or syndromes that are common to all livestock species, and the risk can be reduced or controlled by proper management and care. See "Health and Welfare"

How can I make money out of alpacas?

- Selling their fleece (they are shorn annually)
- Selling products made from alpaca fibre
- Selling alpaca related products
- Selling stock you have bred
- Selling the stud services of your macho
- Agisting animals for other owners
- Composting alpaca dung and selling as fertiliser
- Learning to shear, and selling your services as an alpaca shearer
- Charging the public to visit your alpaca farm

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How Much Water Do My Animals Need Each Day?

Use the table below to estimate daily water requirements. In cooler weather below 75 degrees, water consumption will be less. In estimating demand, it will be best to stay on the high side.

Species	Amount of Water
Beef and Dairy Cattle Non-Lactating	10-15 gallons per day
Lactating Cows and Bulls	20 gallons per day
Young Growing Cattle (< 500 lbs)	5-10 gallons per day
Sheep	1-2 gallons per day
Goats	1-2 gallons per day
Llamas	2-5 gallons per day
Alpaca	2-5 gallons per day
Donkey	6 gallons per day
Mature Horse	12-15 gallons per day
Pigs	1-2 gallons per day

Example:
I have 10 beef cows with calves.

Daily water requirement per cow = 20 gallons per day

10 lactating cows X 20 gallons per day = 200 gallons per day herd demand

If my water is turned off for two days, I would need at least 500 gallons of storage – Note: this gives you 100 gallons extra in case of delays with the water coming back on.

Your Herd:

Number of Animals: _____

Water Requirement per animal _____ gallons

# of Animals _____ X Water Requirement / animal _____ = _____ daily herd demand (gallons)

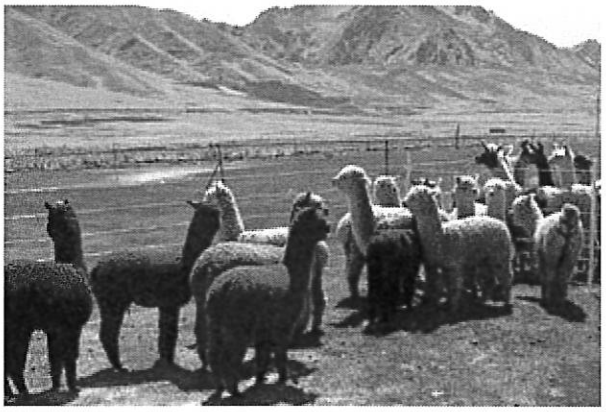
# of days without water _____ X Daily herd demand _____ = _____ Minimum Storage (gallons)

Please contact Roger Ingram, UC Farm Advisor and County Director, at 530.889.7385 or rsingram@ucdavis.edu. More information is available at ceplacer.ucdavis.edu.

PennState Extension

Llamas and Alpacas

Nutrition



Body Condition Scoring of Llamas and Alpacas

Body condition scoring (BCS) is an easy and effective way to determining an animal's fat stores and long-term energy balance. This document describes the use of a 5-point scoring system with half scores similar to that used in other domestic species.

Copper Nutrition in Camelids

Copper (Cu) is another one of the essential microminerals required by llamas and alpacas as well as all other animals and people to help maintain normal body functions.

Selenium Nutrition in Camelids

Selenium (Se) is one of a number of essential microminerals required by llamas and alpacas as well as all other animals and people to help maintain normal body functions.

Hepatic Lipidosis in Camelids

A brief look into the pathogenicity and prevalence of hepatic lipidosis among camelids.

Hepatic Lipidosis in Llamas and Alpacas Part 1 - Recognizing the Disease

This publication explains hepatic lipidosis including its causes, how to diagnose it early, and methods for treatment and prevention.

Hepatic Lipidosis in Llamas and Alpacas Part 2 - Disease Therapy and Prevention

This followup publication about hepatic lipidosis explains treatment for an afflicted animal and offers feeding management methods to lower the risk for this disease.

How Well are They Growing

Learn about camelid growth, growth requirements, growth curves, and proper data collection. Readers may submit growth data for their own camelid(s).

Inquiries on Skin Diseases and Eating Problems

Learn about skin diseases and eating problems in camelids.

Urinary Blockage in Llamas and Alpacas

A brief explanation of urolithiasis, predisposing factors, and health implications.

What is Forage Quality and How Does it Effect a Feeding Program?

This article discusses what type of forage and how much is needed for llamas/alpacas. It provides and overview of forage quality and the important of a good quality forage in the diet.

Determining Forage Quality: Understanding Feed Analysis

Learn how to use feed analysis to determine forage quality, and exactly what feeding a high quality forage means.

Feed Analysis: It's All About Energy

Learn what grains are, what they contain, and how they can be used to meet the nutritional requirements of llamas and alpacas.

Problems Following Grain Consumption

A response to a question about a llama that frequently regurgitates his food after eating; possible explanations and details issues related to grain consumption.

Where'd the Sun Go? Vitamin D and Bone Development

This article explains the benefits of vitamin D in bone development. It discusses Rickets and the signs and symptoms. It also discusses the harmful effects of a deficiency in vitamin D in the diet.

Which One, Loose or Block Salt Feeding?

This article discusses whether loose or salt block feeding is more appropriate to feed to alpacas and llamas. It also discusses salt intake and offers recommendations for salt feeding.

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Education and Research
Local Foods and Communities
Social Justice and Quality of Life
Videos

Llamas and Alpacas

Llamas and Alpacas on the Farm (PDF | 1066 KB)
ATTRA. National Sustainable Agriculture Information Service.
"Discusses considerations for raising llamas and alpacas, including regulations, marketing, nutrition, care, reproduction, and handling."

Alpaca Owners and Breeders Association
Alpaca Owners and Breeders Association.
Information for the commercial and home rancher of alpacas covering economics, marketing, husbandry, history of alpacas, list of farms and ranches, breeding and more.

International Llama Registry
International Lama Registry.
Membership organization provides genealogical registry system, reports and research services for owners of subspecies of the Lama, including llama (Lama glama), guanaco (Lama guanicoe), vicuna (Lama vicugna) and crossbreeds.

Alpaca Registry
Alpaca Registry.
Registry of alpaca (Lama pacos) breeds. Database houses the genealogy, blood typing/DNA and ownership records of alpacas primarily located in North America.

Camelids, South American: Llamas, Alpacas, Guanacos, and Vicunas, 2009
USDA (United States Department of Agriculture). NAL (National Agricultural Library). Animal Welfare Information Center.
Provides information on the Camelidae family and their characteristics, production, use and products. Updates Information Resources on the South American Camelids: Llamas, Alpacas, Guanacos, and Vicunas 1943-2006, AWIC Resource Series No. 12 - February 2006. A large bibliography derived from the AGRICOLA (AGRICulture OnLine Access) database is included.

Canadian Llama and Alpaca Association
Canadian Llama and Alpaca Association.
Identifies and registers llamas, alpacas, guanacos and vicunas in Canada. Site includes links to information and organizations in Canada and the United States.

Guard Llamas: A Part of Integrated Sheep Protection (pdf | 368 KB)
Iowa State University. University Extension.
Publication discussing the use of llamas to protect sheep from coyote predation.