

THE IMPACT OF BREEDING AND FARMING CONDITIONS ON THE WELFARE OF ALPACAS (*VICUGNA PACOS*)

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ABSTRACT

The welfare of alpacas in farming varies and is influenced by various factors, including environmental conditions, nutrition, interactions with humans, and grooming and breeding practices. It is crucial to provide adequate space for the animals both indoors and in outdoor areas due to their herd-oriented nature. Interactions with humans play a significant role in alpaca farming. Proper handling and gentle treatment positively affect their behavior. However, excessive contact at a young age may lead to undesirable behaviors such as Berserker syndrome. Processes such as birthing, weaning, shearing, as well as other breeding practices, impact the welfare of alpacas. Understanding the animals' natural needs and minimizing stress are essential to providing optimal living conditions for them.

Key words: Alpacas (*Vicugna pacos*), welfare, environment, human interaction

INTRODUCTION

The Law on the Farming of Livestock was amended in 2022. Alpacas were granted the status of farm animals, allowing breeders to apply for various forms of funding. It is estimated that there are currently around 2000 alpacas in Poland [Markowska-Daniel et al. 2018]. The exact number is difficult to determine because alpaca farming is still relatively new in Poland, and not all farms are registered. Alpacas are primarily raised in Poland for their wool, which is highly valued for its properties. Alpaca wool is soft, warm, lightweight, and hypoallergenic.

Alpacas are herbivorous animals with a distinctive body structure. As ruminants, they spend most of their time grazing in pastures, consuming available plants. Their three-compartment stomach is highly efficient in digesting low-quality forage. In backyard breeding, alpacas are primarily fed with pasture grass and hay. Alpacas should have free access to hay and feed (with large feeding troughs and feeders). It is extremely important to provide them with constant access to fresh and clean water. During periods of increased vegetation (summer and autumn), in addition to grass, alpacas should be

given hay rich in bulky feed but with moderate nutrient content.

Animal welfare is defined as the overall state of an animal's mental and physical health in which the animal maintains harmony with its environment [Hughes 1976]. Alpacas are herd animals originating from the Andes in South America. They require suitable environmental conditions to thrive, ensuring their comfort and safety. The welfare of alpacas has a significant impact on their health, fiber quality, fertility, and resilience.

ENVIRONMENT

In alpaca farming, commonly used structures include year-round livestock buildings and shelters, which provide protection for the animals against adverse weather conditions while they are out in the paddock. Indoor alpaca farming requires providing them with adequate space. Alpacas can be kept either in groups or individually, but in both cases, they should have the opportunity to observe each other. Providing adequate space is crucial for the welfare of alpacas.

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In European alpaca husbandries, alpacas are typically kept in a semi-intensive system. This means that the animals reside in specially designated buildings that provide essential living conditions while also having access to an outdoor area.

The optimal solution for alpacas is wooden buildings, uninsulated, ensuring adequate light and ventilation. A floor covered with sand and a layer of straw creates excellent conditions for the animals (Fig. 1). Alpacas can also be kept in buildings with concrete floors. During cold winter temperatures, it is advisable to lay bedding on the concrete. For larger-scale husbandries, buildings should be equipped with ventilation systems to prevent wool moisture [Cebra 2014].

Depending on the size of the building and the number of animals, separate enclosures should be designated within alpaca housing facilities. The division should consider the age and gender of the animals. Pregnant females and females with young offspring are best kept together in one enclosure. Young animals weaned after reaching 6 months of age should be moved to a separate enclosure. Another enclosure should be allocated for young males aged 1–2 years. Breeding males are best kept in pairs in separate enclosures or in a separate building to avoid conflicts. The minimum floor space per alpaca should be 2 m². Enclosures should be equipped with hay racks, troughs for concentrated feed, and water containers [Krajewska-Wędzina et al. 2020]. During the summer, alpacas spend their entire days on fenced pastures. However, during periods of heat, caution should be exercised as alpacas can easily overheat. In such conditions,

the breeder must ensure access to shade (shelters) and an adequate supply of water.

Alpacas are herd animals, and being in a group provides them with a sense of security. Only in the company of other alpacas can these animals fully experience peace and harmony. Young alpacas thrive best in the company of other young individuals. Mothers and other adult alpacas do not engage in play with the young. Play is characteristic of young alpacas and involves frolicking and mock fighting. Adult alpacas rarely play, but occasionally, they may be observed manipulating objects out of curiosity or playfulness [Kapustka and Budzyńska 2018]. As social animals, alpacas live in family groups consisting of a territorial alpha male, females, and their young. Alpacas warn the herd of intruders by emitting sharp, loud inhalations that sound like high-pitched roaring. The herd may attack smaller predators with their front limbs and spit and kick. Their aggression towards canids (coyotes, foxes, dogs, etc.) is utilized in using them as guard llamas to protect sheep [Franklin and Powell 1994].

Alpacas produce a wide range of vocalizations. The most common is a humming vocalization, which occurs in various situations such as distress or a change in surroundings. Snorting vocalization serves as a warning signal for alpacas. Clucking is a sound used by mothers for their cria. Grumbling indicates territoriality. Squealing occurs when animals are frustrated with food. Stressful situations cause animals to emit loud cries. Danger prompts alpacas to emit high-pitched vocalizations, known as alarm calls [Castillo-Ruiz 2007].



Fig. 1. Alpaca enclosure

Alpacas exhibit a diverse range of grooming behaviors, such as scratching with their hind legs, rubbing against fences or wooden elements, nibbling with their teeth using their long necks, rolling in hay (in barn stalls), and taking sand baths, which serve to protect against external parasites [McGregor 2002]. Alpacas use a common area for defecation, where they do not graze. This behavior is believed to help limit the spread of internal parasites. Generally, males have a much neater and smaller dung pile than females. When one female approaches the dung pile and begins to urinate and/or defecate, the rest of the females often follow suit and queue up to perform the same task. This makes collecting alpaca dung easy and it can be utilized, for example, as garden fertilizer. Such behavior of alpacas allows them to be kept indoors like other companion animals and trained to relieve themselves in one place.

Alpacas can face issues with oral hygiene that affect their food intake and behavior. Signs of such problems include prolonged chewing or food leaking from the mouth. Poor body condition and sunken sides can also indicate dental issues [Castillo-Ruiz 2007].

NUTRITION OF ALPACAS

Alpacas require a properly balanced diet to fully utilize their genetic potential. A deficiency in essential nutrients negatively affects the quality of their fiber, fertility, and weakens the immune system.

Alpacas are grazing animals originating from areas with limited food availability. Their digestive system and metabolism are evolutionarily adapted to a diet low in nutrients but high in fiber. The alpaca's body can "borrow" nutrients from various parts of the body for an extended period to survive under restricted food access. However, it is important to note that these "borrowings" must be repaid. Otherwise, the animal may become ill or even die [Cebra 2014].

In the diet of alpacas, 80–90% consists of roughage (hay, grass) and supplements (beet pulp, alfalfa) as well as root vegetables (beets, carrots) [Krajewska-Wędzina et al. 2020].

Concentrated feeds are not a natural source of energy for alpacas, and their digestive system is not adapted to digesting large amounts of simple sugars and starch. An excess of these nutrients can lead to diseases. Moderate use of concentrated feeds is recommended, and sudden changes in dosage should be avoided. Pelleted mixes are preferred, serving as carriers of trace elements and vitamins, provided they are not based solely on grains but also contain a high proportion of fiber (alfalfa, bran, soybean hulls, beet pulp). Concentrated feeds for alpacas should contain less starch and simple sugars compared to feeds for other livestock [Krajewska-Wędzina et al. 2020].

Watering alpacas is crucial for their well-being. Alpacas drink water with slightly open mouths and prefer open water surfaces, such as ponds. However, they also adapt well to float valve waterers, which maintain a constant water level. Alpacas are reluctant to use valve waterers where pressing a lever is required to obtain water [Miranda-de la Lama and Villarroel 2023].

In our climate, vitamin D deficiencies are common because the amount of UV radiation necessary for its natural synthesis is insufficient. Therefore, young alpacas (cria) require vitamin D supplementation throughout the year to prevent rickets. Adult individuals should only be supplemented in winter [Cebra 2014]. In areas deficient in selenium, such as Poland, there may be a need for selenium supplementation in alpacas.

Alpacas do not use their tongues to manipulate food, making it unlikely for them to use salt licks [San Martín and Van Saun 2013].

Understanding the nutritional needs of alpacas and adjusting their diet to their natural preferences and species requirements is crucial for maintaining their well-being.

HUMAN INTERACTION

Human-animal interactions play a very important role in alpaca farming. A good relationship between the animal and the caretaker facilitates care, grooming, and breeding. Research conducted by Windschnurer et al. [2020] showed that gentle handling of alpacas at a young age has a positive impact on their later behavior and makes them easier to handle. The authors of these studies demonstrated that alpaca caregivers presented varied attitudes and levels of interaction with the animals. There were significant differences in opinions regarding the importance of petting young alpacas (below 10 months). The frequency of touch was also varied. Some caregivers avoided touching, especially petting young alpacas, particularly males. Others petted their animals more frequently, even in the first weeks of their lives. These differences reflect conflicting recommendations regarding alpaca farming. On one hand, a "hands-off policy" is recommended until 6 months of age or avoiding intensive contact until 10 months of age, as intensive contact can lead to aggression towards humans. On the other hand, some recommend intensive handling of newborn animals [McGee Bennett 2014, Lambacher et al. 2015]. Tibary et al. [2014] believe that human contact with young alpacas, especially males, should be limited to prevent later undesirable behaviors such as the Berserker syndrome. The Berserker syndrome is a behavioral disorder in alpacas that typically occurs between 1 and 3 years of age. The cause is inappropriate and unintentional excessive socialization of the animal with humans at a young age, especially in the case of bottle-fed newborns [Ball et al. 2015].

During stressful handling procedures, alpacas may exhibit various behaviors such as spitting, kicking, biting, or pushing humans. These behaviors are easy for caregivers to identify, minimizing the risk of misinterpretation due to subjectivity [Miranda-de la Lama and Villarroel 2023]. The authors demonstrated that caregivers who enjoyed interacting with their animals had better relationships with them. Alpacas were less fearful of humans and easier to handle. Conversely, caregivers who derived less enjoyment from caring for alpacas rated them as more problematic. These animals were more difficult to handle during leading, grooming, nail trimming, and were less calm during veterinary examinations. As alpacas age, some individuals may show signs of aggressive behavior towards caregivers, such as biting, striking, or kicking.

BIRTH AND WEANING OF YOUNG ALPACAS

The survival of a newborn in extensive farming depends on the proper care of the mother and a strong bond between her and the young (Fig. 2). Most births occur from spring to autumn. Alpaca births typically proceed quickly, with over 90% of cases occurring between 7:00 AM and 1:00 PM. This timing adaptation ensures the

newborns the best chance of warming up and drying off before the cold night [Miranda-de la Lama and Villarroel 2023]. According to Sumar [1996], camelids are capable of delaying birth by several days to avoid giving birth at night or on cold days.

Symptoms indicating an approaching birth in alpacas can last from 1 to 6 hours. They include separation of the mother from the herd, loss of interest in eating or grazing, vocalization, restlessness, frequent urination, and lying in a sternal position with hind legs stretched to the side [Whitehead 2009].

After birth, alpacas exhibit minimal maternal care towards their young. Unlike some other mammals, they do not lick or groom their cria (alpaca newborn), nor do they eat or touch the placenta [Smith 1985]. The responsibility for the well-being of the young primarily rests on themselves. Cria must dry themselves off, stand up, and seek out their mother for comfort. Female alpacas recognize their newborns by scent. They reject unfamiliar young, spitting at them or threatening them [Aba et al. 2010]. The mother emits specific sounds towards the newborn, and the cria responds with a version of the same sound, which is a form of communication and recognition. Alpaca mothers typically show little interest in the newborn until it begins to nurse [Whitehead 2009]. The



Fig. 2. Alpaca with her cria (alpaca newborn)

female's mammary glands produce colostrum only for the first 24 hours after birth. The first nursing usually occurs within the first hour after birth, with subsequent nursings occurring every 30 minutes for the first 4 hours of life [Bravo 2014, Gomez-Quispe et al. 2022].

The weaning process of alpacas can affect the well-being of the young animals. During this process, an increased concentration of cortisol is observed, which persists until the third day after weaning. Subsequently, by the fifth day, the cortisol level decreases to baseline values [Bravo and Garnica 2001]. The rise in cortisol levels may be interpreted as a stress response associated with separation from the mother, which can affect the well-being and welfare of young alpacas in the first days after weaning.

SHEARING

Lately, there has been growing interest in the impact of shearing on animal welfare. Shearing alpacas can have both positive and negative effects on welfare. Shearing helps alpacas stay cool during warm months. Regular shearing can also aid in maintaining animal hygiene, preventing skin and parasitic issues. The shearing process can be stressful for alpacas. The sounds of the shearing machine, contact with unfamiliar individuals, handling, and the need to maintain a specific position can cause anxiety in the animals.

The method of handling alpacas before shearing can impact their welfare. Lifting an alpaca from the ground and placing it on a table may be more stressful than encouraging it to lie down. The lying position is a natural defensive behavior and may be less stressful for alpacas. The longer the handling and shearing process, the higher the level of stress in the animals [Taraborelli et al. 2011]. It is crucial to use a gentle approach during shearing, minimizing stress in animals and providing them with safe conditions.

After shearing, alpacas have been observed to exhibit a tendency for reduced foraging and chewing, while maintaining an increased level of affiliative social interactions (behaviors that reinforce social bonds between animals). In times of stress, alpacas may groan and sometimes growl. In a study by Waiblinger et al. [2020], fewer animals emitted vocalizations when shorn standing up. Among the animals that vocalized, there was a direct correlation with the noise produced by the shearing machines. Vocalizations tended to decrease when the shearing machine was turned off.

SUMMARY

The impact of alpaca farming on their welfare is diverse and depends on various factors such as environmental conditions, nutrition, interactions with humans, as well

as grooming and breeding practices. Alpaca farming in Poland mostly takes place in specially adapted buildings or shelters, depending on the size of the farm. It is important to provide animals with adequate space, both indoors and outdoors. Alpacas are herd animals that require companionship and thrive in groups.

Interactions with humans play an important role in alpaca farming. Proper handling and gentle treatment have a positive impact on their behavior. However, excessive contact at a young age can lead to undesirable behaviors such as Berserk Syndrome. Processes such as birth, weaning, shearing, and other husbandry practices affect the welfare of alpacas. It is important to understand the animals' natural needs and minimize stress during these procedures.

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WPŁYW WARUNKÓW CHOWU I HODOWLI NA DOBROSTAN ALPAK (*VICUGNA PACOS*)

STRESZCZENIE

Dobrostan alpak w hodowli jest zróżnicowany i podlega wpływowi różnych czynników, m.in. warunków środowiskowych, żywienia, interakcji z ludźmi oraz zabiegów pielęgnacyjnych i hodowlanych. Bardzo ważne jest zapewnienie zwierzętom odpowiedniej przestrzeni zarówno wewnątrz, jak i na wybiegach, z uwagi na ich stadny charakter. Interakcje z ludźmi odgrywają istotną rolę w hodowli alpak. Prawidłowy kontakt i delikatne obchodzenie się z nimi wpływają pozytywnie na ich zachowanie. Niemniej jednak, nadmierny kontakt w młodym wieku może prowadzić do niepożądanych zachowań, takich jak zespół Berserka. Procesy, takie jak poród, odsadzenie młodych, strzyżenie, a także inne zabiegi hodowlane wpływają na dobrostan alpak. Bardzo ważne jest zrozumienie naturalnych potrzeb zwierząt i minimalizowanie stresu, aby zapewnić im optymalne warunki bytowe.

Słowa kluczowe: alpaka (*Vicugna pacos*), dobrostan, środowisko, kontakt z człowiekiem