

# BIOLOGICAL FEATURES AND PRODUCTIVITY OF ALPACA

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Short communication

**Abstract:** Alpaca domestication took place more than 6000 years ago. The Indians of Peru discerned the potential in these animals, tamed them and began to breed. In the past, alpacas were called the “Inca gold”: they could provide people with all the necessary resources for living. People dressed in skins, ate meat, spun wool and made clothes, and used manure as fuel. An increase in the number of livestock on the Russian Alpaca and Capri farms favorably affects the further distribution of alpaca as a species in Russia. The possibility of recognition of alpaca as an agricultural animal will be the sale of wool, its processing, as well as the rejection of imported raw materials.

**Key words:** alpaca, Andean sheep, eco-farm, wool, tylopoda, camelid.

## Introduction

Alpaca or Andean sheep lives on the highlands of South America in the Andes, at an altitude of 3500 - 5000 meters in Ecuador, Southern Peru, Northern Chile and Western Bolivia (*Wheeler, 2016*).

Alpaca belongs to the cloven-hoofed detachment, the corpus callosum, the camelid family, the vicuna family, and the alpaca species. Earlier, alpaca was mistakenly assigned to the genus of llamas, later, scientists make changes to the taxonomy. This is due to the fact that the ancestors of the alpaca are vicunas, and lamas are guanacos. Crossbreeding these animals between themselves gives the prolific offspring of variso (or vari), which is characterized by a flexible character, but significantly low wool quality. All four families have 37 chromosomes and can freely interbreed. Animals lead a daily life, these are herd animals, their life expectancy is up to 25 years, production is up to 7 years (*Lalonde, 2014*).

Reproduction of alpaca has its own characteristics, and does not have a clear seasonality when animals are raised on a farm. Unlike sheep and cattle, alpaca is always in the follicular phase, therefore, until the mating occurs, the

female is in a constant state of estrus. Ovulation occurs 26 hours after stimulation. Artificial insemination is difficult due to the laying position of the female during mating. Abroad, embryo implantation is practiced. In natural mating, high mortality of the embryos is observed, only 50% of them remain viable after 30 days of embryonic development. The female's pregnancy lasts 11 months, one offspring weighing 8 kg is born, the lactation period lasts 6 months. Maturity in females occurs by 18 months, in males by 2.5 years (*Kochish et al., 2008; Fanny, 2016*).

The alpaca constitution is dense, lean, with a slight bias towards flexibility. She is associated with her lifestyle, as the animal must be smart and light, so that it can easily move up the hills and run away from natural enemies. The respiratory type is characterized by increased metabolism. Animals have elongated limbs, a long neck and trunk, straight thin lines. Intensive oxidative processes inhibit fat deposition in alpaca. In the physique, the free proximal femur is noticeable (*Wheeler, 2016*).

The callosities have no hooves, and on the two-fingered limbs there are only blunt, curved claws, they must be trimmed to avoid curvature and weakening of the joints of the legs. They do not rely on the ends of the fingers, like ungulates, but on the totality of the phalanges of the fingers. The lower surface of the foot is a pair of corpus callosum. Unlike artiodactyls, alpaca does not trample grass, which favorably affects pastures (*Clive, 2017*). Alpaca has started breeding in Russia and is becoming a very popular domestic animal (*Alpakainfo website*). The aim of this paper is to present the basic breeding and morphological characteristics of the Alpaca in Russia.

## Materials and Methods

Alpaca measurements in table 1 were obtained by measuring the articles of animals at the Russian Alpaca eco-farm in Moscow Region, Dmitrovsky District, and the village of Pokhodkino, where the alpaca population is 11 males and 9 females, as well as 3 llamas. The study was conducted in September 2018 by a random sampling of sexually mature females and male males born in 2009-2011. The tools that were used are a measuring stick, tape, compass. All animals were kept and feed in the same breeding conditions according to the technology used. Data processing was performed by descriptive statistical analysis.

## Results and Discussion

### *Biological features*

The physical appearance of the alpaca phenotypes is shown in Figures 1 and 2.

Callosities - ruminants, the rumen and abomasum have a special structure and are very different from those of other ruminants; the ruminant stomach is missing. The cecum is short. Half of the lower jaw fused. Able to eat sparse vegetation, shrubs, spines. The animal captures grass, stems and branches with the help of incisors pressing them to the tooth pillow (chewing plate) on the upper jaw. The incisors are located on the lower jaw in an amount of 6 pieces (3 on each side), are not sharpened in enamel and grow throughout life. If the alpaca has the correct bite, then they grind from friction against the tooth pillow when closing, if the teeth protrude significantly forward, then natural abrasion does not occur, it is necessary to cut the incisors. There are “fighting” fangs, most noticeable in males. There are no horns (Summerton, 2017).



**Figure 1. Taking Alpaca Measurements of Russian Alpacas**



**Figure 2. Animals on the eco-farm**

Alpacas and llamas have certain behavioral characteristics that distinguish them from other domestic animals. They defecate and urinate in limited areas, even if they are given freedom of movement to other places. This habit is very important in the fight against internal parasites (*Kochish et al., 2008*).

The respiratory system is tuned to high-altitude discharged air, red blood cells are elliptical and their growth rate is increased, the bone marrow works intensively, the blood supplies the body with oxygen enough, as a result of which hypoxia does not occur. Camelids are model animals in many pharmaceutical companies, which are developing to create drugs based on their antibodies. One of the organizations that participates in these studies is the Capri farm in the Kaluga Region, which provides alpaca blood to scientific laboratories. Farm animals “Russian Alpacas” also take part in research (*website village, 2015, Summerton, 2017*).

The use of alpacas as pack animals for mountaineering is very developed, they can carry up to 50 kg over short distances, after a short rest they are ready to work again, that is why they are inferior to their relatives llama and camel. Alpaca is the undisputed leader in the production of fine wool (*Wheeler, 2016*).

Animals give valuable wool of quality 80 while merino wool of quality 60. Two alpaca breeds are known - huakaya and suri. In huakaya, crimped wool with a fineness of 20-32  $\mu\text{m}$  is similar to the coat of sheep of the Corridel breed. Suri has a longer and thinner hair of 19-25 microns, pigtailed hang down to the ground, having a corkscrew shape resembling the hair of a Lincoln sheep. The number of suri is small, it makes up only 5 percent of the whole species - 3 million, this is about 120 thousand individuals, so their wool is twice as valuable. Haircuts are carried out once a year in May and June. Alpaca wool having a fineness of more than 35  $\mu\text{m}$  is classified as llama wool.

The most valuable fleece is obtained after the first haircut called “Baby Alpaca”. The fiber fineness changes with age, which ranges from 1  $\mu\text{m}$  to 5  $\mu\text{m}$  per year. The length of the fur on the sides is 15-20 cm. The hairline is similar to the coat of sheep, but has a number of features. Fibers are stronger than Angora wool, finer than cashmere, smoother than silk fibers, softer than cotton, warmer than goose down, it is believed to be warmer than sheep’s wool and more hygroscopic (*Bengtsson, 2016, Website village, 2015*).

There are 22 natural shades, from white, traditionally beige or silver to brown and black, white is valued above all. The fiber is not subject to rolling during wear. The grease is absent in the composition of the rune (*Bengtsson, 2016*).

### *Production features*

The results of the body measures of the animals are shown in Table 1. Alpaca has no external signs of sexual dimorphism, but after analyzing the table,

we can conclude that the group of males is superior to the group of females in the following parameters: height at the withers, height in the sacrum, chest depth, chest circumference.

Females lead in terms of breast width and OBL. Ilium width and metacarpus have the same parameters for both sexes. Also, if we consider animals individually, it is noteworthy that the males Isaak and Rocky are physically close to females in most parameters, and Charlie leads in almost all respects.

**Table 1. Results of Alpaca body measurements**

Traits	Sex							
	Male				Female			
	Isaak	Charly	Rokki	$\bar{x}$	Silvia	Matilda	Ella	$\bar{x}$
Height at the withers,cm	93	94	93	93	89	90	89	90
height in the sacrum, cm	94	95	94	94	90	92	91	91
Metacarpus, cm	14	13	12	13	13	13	12	13
Oblique body length (OBL), cm	79	79	76	78	80	80	79	80
Ilium Width, cm	22	25	22	23	22	23	23	23
Chest width, cm	25	30	28	28	28	30	29	29
Chest depth, cm	35	40	40	38	35	35	36	35
Chest circumference,cm	107	120	116	114	111	115	110	113

From the table shown, we can see that male throats in most cases have higher values of measured performance. it is also noted that female animals also had an advantage in certain traits. Phenotype variability is also seen, which provides the possibility of selection in the population during the next rearing period.

Table 2 shows data on live weight and shearing of animal hair from the Russian Alpaca farm.

**Table 2. Live weight and wool cut**

Sex	Males				Females			
Names	Isaak	Charly	Rokki	$\bar{x}$	Silvia	Matilda	Ella	$\bar{x}$
Body weight, kg	70.5	83.3	76.3	76.7	55.8	68.2	61.2	62
Wool cut, kg	4.1	5.2	4.8	4.7	2.8	3.5	3.8	3.4

The average mass of males exceeds females by 15 kg, which indicates that they are larger. Repeatedly observed sexual dimorphism. There is a noticeable dynamics of an increase in hair cut depending on the live weight of alpaca, this feature is not dependent on the sex of the animal. According to the table, it can be understood that the animal with the smallest live weight has the minimum shear in

the group, and the alpaca with the highest weight indicator leads in the amount of kg of sheared wool.

## Conclusion

Alpaca in Russia is an exotic non-common species. Most of them are contact animals living on eco farms.

An increase in the number of livestock on the Russian Alpaca and Capri farms favorably affects the further distribution of alpaca as a species in Russia. The possibility of recognition of alpaca as an agricultural animal will be the sale of wool, its processing, as well as the rejection of imported raw materials.

## Produktivnost i biološke karakteristike alpake

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## Rezime

Pripitomljavanje Alpake desilo se pre više od 6000 godina. Indijanci Perua opazili su potencijal ovih životinja, pripitomili ih i počeli da ih gaje i razmnožavaju. U prošlosti su se alpake zvale „Inka zlato“: One su mogle pružiti ljudima sve potrebne resurse za život. Ljudi su oblačili kože, jeli su meso, preli vunu i pravili odeću i koristili stajski gnoj kao gorivo. Povećanje broja stoke na ruskim farmama alpake i kapri povoljno utiče na dalju distribuciju alpake kao vrste u Rusiji. Mogućnost prepoznavanja alpake kao farmske/poljoprivredne životinje je kroz prodaju vune, njena prerada, kao i odbacivanje uvoznih sirovina.

**Ključne reči:** alpaka, andske ovce, eko-farma, vuna, tilopoda, kamelid.

## References

- ALPAKAINFO website [Electronic resource] - Access mode: <https://www.alpacainfo.ru/> free. - Zagl. from the screen, 2019.
- BENGTSSON F. (2016): Fiber quality and fertility in male alpacas in Cusco region, Peru.
- CLIVE S. (2017): Alpaca. Alpacas as Pets. Alpaca Book for Care, Costs, Behavior, Feeding, Health, Play and Exercise. Zoodoo Publishing, 120 pp.
- FANNY B. (2016): Fibre quality and fertility in male alpacas in Cusco region, Peru. Fiberkvalitet och fertilitet hos alpackahannar i Cuscoregionen. Faculty of

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Veterinary Medicine and Animal Science Department of Clinical Sciences, Peru, 24 pp.

KOCHISH I. I., KALYUZHNY N. S., VOLCHKOVA L. A., NESTEROV V. V (2008): Zoohygiene. Publishing House.

LALONDE J. (2014): Alpaca Reproduction. Big Meadow Creek Alpacas, 5-13.

SUMMERTON C. (2017): Alpaca. Alpacas as Pets. Alpaca book for care, costs, behavior, feeding, health, play and exercise. Zoodoo Publishing.

WEBSITE VILLAGE [Electronic resource]-Access mode: <https://www.thevillage.ru/village/business/svoemesto/215919-alpaki> free. - Zagl. from the screen, 2015.

WHEELER J. C. (2016): South American camelids-past, present and future" Journal of Camelid Science,5:1-24.

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