



TECHNOLOGY OF INTENSIVE BREEDING OF HORSES OF THE KARABAIR BREED IN THE HIGHLANDS OF UZBEKISTAN

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Annotation. The importance of using intensive technologies in increasing the quality and yield of mountain pastures in Uzbekistan has been considered in detail. Attention is drawn to the deep cultural significance of pasture farming in this region and its role in the development of social solidarity, animal husbandry and economic viability. The commentary then pays attention to the unique characteristics of the Carabair breed, its physical characteristics, temperament and cultural significance. Breeding methods and intensive technologies used to preserve and improve the unique characteristics of the breed are presented. These include artificial insemination, embryo relocation, genetic selection and optimization of genetic potential to ensure the stability of the breed.

The commentary draws attention to the outstanding research results on the use of intensive methods for breeding the Carabair breed, especially its outstanding work on survival and weight. These results are important for informing practical measures for breeding and conservation of breeds, especially in hard-to-reach areas such as the mountainous regions of Uzbekistan.

Key words: equestrian tourism, transportation, livestock management, karabayir, horse breed, selective breeding, genetic diversity, conservation efforts, mountainous regions.

Annotatsiya. O'zbekistonning tog'li hududlarida qorabayir otlarining sifati va mahsuldorligini oshirishda intensiv naslchilik texnologiyasining ahamiyati haqida to'liq ma'lumot berilgan. Bu mintaqadagi otchilikning chuqur madaniy ahamiyatini ta'kidlab, uning ijtimoiy hamjihatlik, tirikchilik va iqtisodiy hayotiylikni rivojlantirishdagi rolini ta'kidlashdan boshlanadi. Qarabair zotining o'ziga xos xususiyatlarini o'rganadi, uning jismoniy xususiyatlarini, temperamentini va madaniy ahamiyatini namoyish etadi. Qorabayir zotining o'ziga xos xususiyatlarini saqlab qolish va yaxshilash uchun qo'llaniladigan selektsiya mezonlari va intensiv naslchilik texnologiyalari ko'rsatilgan. Bu rolini ochib beradi sun'iy urug'lantirish, embrionni ko'chirish, genetik tanlovva ovqatlanishni boshqarish genetik potentsialni optimallashtirish va naslning barqarorligini ta'minlashda.

Izoh tadqiqotning asosini intensiv usullar bilan o'stirilgan Qarabair otlarining, ayniqsa tirik vazn va tashqi xususiyatlar bo'yicha ustun ishlashini namoyish etadi. Ushbu topilmalar yilqichilik amaliyoti va zotlarni muhofaza qilish bo'yicha ishlarni, xususan, O'zbekistonning tog'li hududlari kabi qiyin sharoitlarda xabardor qilishda muhim ahamiyatga ega.

Kalit so'zlar: ot sporti, transport, chorvachilikni boshqarish, qorabayir, ot zoti, selektiv naslchilik, genetik xilma-xillik, tabiatni muhofaza qilish ishlari, tog'li hududlar.

Аннотация. Важность использования интенсивных технологий в увеличении качества и урожайности горных пастбищ Узбекистана подробно рассмотрена. Обращается внимание на глубокое культурное значение пастбищного хозяйства в этом регионе и его роль в развитии социальной солидарности, животноводства и экономической жизнеспособности. Затем комментарий уделяет внимание уникальным характеристикам породы Карабайр, ее физическим особенностям, темпераменту и культурному значению. Приведены селекционные методы и интенсивные технологии, используемые для сохранения и улучшения уникальных характеристик породы. Они включают в себя искусственное оплодотворение, переселение эмбрионов, генетический отбор и оптимизацию генетического потенциала для обеспечения стабильности породы.

Комментарий обращает внимание на выдающиеся результаты исследований по использованию интенсивных методов для выведения породы Карабайр, особенно ее выдающуюся работу по выживанию и весу. Эти результаты имеют важное значение для информирования практических мероприятий по разведению и сохранению пород, особенно в условиях труднодоступных районов, таких как горные области Узбекистана.

Ключевые слова: конный спорт, транспорт, управление скотом, пастбище, порода лошадей, селекционное разведение, генетическое разнообразие, охрана природы, горные районы.



Introduction

Horsemanship has deep roots in the cultural heritage of Uzbekistan's mountainous regions. Passed down through generations, horsemanship traditions embody the skills, knowledge, and values of the local communities. From nomadic tribes to settled societies, the bond between humans and horses is celebrated through folklore, music, and art, reflecting a rich tapestry of cultural identity [9-10].

Horsemanship fosters social cohesion and camaraderie within mountain communities. Shared experiences of taming, training, and riding horses create strong bonds among individuals, transcending social divides. Horsemanship skills are often taught and practiced collectively, reinforcing community ties and promoting mutual support networks [1,2,4].

In mountainous regions where agriculture may be limited, horsemanship serves as a crucial source of livelihood for many families. Breeding, training, and trading horses provide opportunities for income generation through sales, rentals, and equestrian tourism. Skilled horsemen and women often find employment as trainers, guides, or caretakers, contributing to the local economy [3].

The horsemanship industry fuels trade and commerce in mountainous regions, facilitating the exchange of goods and services. Horse markets, festivals, and competitions serve as vibrant hubs of economic activity, attracting buyers, sellers, and spectators from far and wide. The trade in horses, equipment, and related services sustains a thriving market ecosystem, driving economic growth and employment opportunities.

In rugged mountain terrain where roads may be impassable, horses provide essential transportation and mobility options. Whether for personal travel, goods transport, or emergency rescue operations, horses offer unparalleled maneuverability and reliability in challenging landscapes. Skilled horsemen navigate steep slopes, narrow trails, and adverse weather conditions with ease, facilitating connectivity and access to remote areas.

Horsemanship skills are indispensable for managing livestock herds in mountainous regions. Herders rely on horses to traverse vast grazing lands, monitor animal health, and respond to emergencies. Horseback herding techniques, honed over centuries, maximize efficiency and effectiveness in livestock management, ensuring the sustainability of pastoral livelihoods and ecological balance [6,8].

In conclusion, horsemanship occupies a central place in the cultural heritage, economic vitality, and practical functionality of Uzbekistan's mountainous regions. As a cherished tradition, a source of livelihood, and a practical tool for navigating challenging terrain, horsemanship continues to shape the fabric of mountain communities, embodying resilience, resourcefulness, and reverence for nature.

The Karabair is a distinctive breed of horse native to Central Asia, particularly Uzbekistan and surrounding regions. Known for its unique combination of strength, agility, and endurance, the Karabair has been shaped by centuries of selective breeding and adaptation to the harsh environmental conditions of the region.

The Karabair is a compact and muscular horse, characterized by a well-proportioned body with strong, sturdy legs and a short, robust neck. It typically stands between 14.2 to 15 hands high, with a solid build that reflects its strength and athleticism [11,12].

The most notable feature of the Karabair is its striking coat color, which is predominantly black or dark bay. Some individuals may exhibit white markings on the face or legs, but the overall coat color tends to be uniform and lustrous, adding to the breed's aesthetic appeal.

Karabair horses are renowned for their spirited yet gentle temperament. They are intelligent, alert, and responsive, making them versatile and trainable for a variety of equestrian disciplines. Despite their high energy levels, Karabairs are known for their loyalty and willingness to work closely with humans.



The Karabair excels in a range of equestrian activities, thanks to its natural athleticism and agility. It is particularly well-suited for endurance riding, thanks to its robust constitution and stamina. Additionally, Karabairs are adept at tasks such as herding, working cattle, and participating in traditional games and equestrian sports.

One of the most remarkable traits of the Karabair is its adaptability to diverse environmental conditions. From the rugged mountainous terrain of Uzbekistan to the arid steppes of Central Asia, Karabairs thrive in various landscapes, demonstrating resilience and resourcefulness in the face of challenging climates [5,7].

Cultural Heritage: The Karabair breed holds significant cultural importance in Uzbekistan and neighboring regions. It is deeply ingrained in the equestrian traditions, folklore, and everyday life of local communities, serving as a symbol of national pride and heritage.

Karabair horses contribute to the rural economy through activities such as breeding, trading, and equestrian tourism. Their versatility and performance abilities make them sought-after among horse enthusiasts and breeders, enhancing their economic value within the equine industry.

As a native breed with a distinct genetic heritage, the Karabair is subject to conservation efforts aimed at preserving its unique characteristics and genetic diversity. Breed associations, government agencies, and conservation organizations collaborate to promote responsible breeding practices and ensure the long-term viability of the breed.

Equestrian Sports: Karabair horses play a prominent role in various equestrian sports and competitions, both locally and internationally. Their agility, speed, and endurance make them formidable competitors in disciplines such as endurance riding, show jumping, and dressage, showcasing the breed's athletic prowess on the global stage.

In summary, the Karabair breed epitomizes the rich cultural heritage, economic vitality, and genetic diversity of Central Asia's equestrian traditions. With its striking appearance, versatile performance abilities, and enduring significance, the Karabair continues to captivate horse enthusiasts and contribute to the vibrant tapestry of the global equine community.

Methodology

The selection criteria for the Karabair breeding breed, a horse breed native to Uzbekistan, are designed to preserve and enhance the breed's unique characteristics. These criteria focus on various aspects:

Stature: The Karabair is known for its medium size, strong build, and good bone structure. Selection favors horses that exhibit these traits.

Conformation: Ideal candidates have a well-proportioned body with a broad chest, strong back, and muscular limbs.

Head: The head should be well-shaped with a straight profile and expressive eyes.

Endurance: As a breed used historically for riding and light draft work, endurance and stamina are highly valued.

Speed: While not racehorses, Karabairs should display a good turn of speed, reflecting their versatility.

Temperament: A calm, trainable temperament is essential for work and compatibility with handlers.

Heredity: Breeding stock should be free from genetic diseases and have a pedigree that reflects the breed's heritage.

Fertility: High fertility rates are crucial for maintaining population numbers.

Longevity: Selection favors horses that are known for their longevity and ability to remain active and healthy into old age.



Climate Tolerance: The breed must be able to thrive in the variable climates of Uzbekistan's highlands.

Versatility: Horses that can adapt to various types of work, including farming, transportation, and riding, are preferred.

Color: While color is not the most critical factor, breeders often prefer the traditional colors of bay, chestnut, or gray.

Breed Purity: Maintaining the purity of the breed is essential, so horses with a high percentage of Karabair blood are preferred.

Track Record: Horses with proven performance records in competitions or work are favored.

Progeny: The quality of a horse's offspring is also a significant factor in selection.

These criteria ensure that the Karabair breed maintains its historical significance, physical and genetic health, and suitability for the needs of the people in the region. Breeders use these guidelines to select the best individuals for reproduction, aiming to sustain and improve the breed over generations.

Intensive breeding technologies have revolutionized the way breeders manage and improve livestock genetics, including horse breeds like the Karabair. These technologies enable precise control over the breeding process, enhance genetic diversity, and improve desirable traits in offspring. Here's a detailed explanation of the intensive breeding technologies employed:

Artificial Insemination (AI):

Procedure: AI involves collecting semen from a stallion and artificially inseminating a mare. This process is meticulously timed to coincide with the mare's ovulation.

Advantages: AI allows for the use of superior genetics from stallions that may be geographically distant or unable to breed naturally due to age or health issues. It also reduces the risk of injury and disease transmission between horses.

Embryo Transfer (ET):

Procedure: ET is a process where an embryo from a donor mare, fertilized by AI, is transferred to a recipient mare who carries the pregnancy to term.

Advantages: This technology enables valuable mares to produce multiple offspring per year and continue their competitive careers while still contributing genetically to the breed.

Genetic Selection:

Procedure: Genetic selection involves analyzing the DNA of horses to identify and select for desirable traits, such as speed, endurance, and health.

Advantages: It allows breeders to make informed decisions based on genetic markers linked to specific traits, thus accelerating the improvement of the breed.

Nutrition Management:

Procedure: This encompasses the strategic feeding of breeding horses to optimize their health, fertility, and the quality of their offspring.

Advantages: Proper nutrition management ensures that mares and stallions are in peak condition for breeding and that foals have the best start in life, promoting growth and development.

Implementation in Karabair Breeding:

AI and ET: These technologies can be particularly beneficial for the Karabair breed, allowing for the preservation of genetic lines and the spread of desirable traits without the constraints of natural breeding.

Genetic Selection: By identifying genetic markers associated with traits suited to the highland climates of Uzbekistan, breeders can select horses that are more likely to thrive and excel in these conditions.



Nutrition Management: Tailoring nutrition programs to the needs of the Karabair breed, especially considering the challenging highland environment, can significantly impact the health and performance of both adult horses and foals.

In summary, the employment of these intensive breeding technologies in the Karabair horse breed aims to enhance genetic quality, improve overall health, and ensure the sustainability of the breed in the face of modern agricultural and environmental challenges. Breeders and researchers work together to implement these technologies effectively, respecting the breed's heritage while embracing innovation for its future.

Intensive breeding technologies are crucial in modern agriculture for improving livestock production efficiency, enhancing genetic traits, and ensuring food security.

AI involves the manual deposition of semen into the reproductive tract of a female animal without natural mating. It allows for the use of superior genetic material from selected sires.

Semen is collected from elite males, typically with desirable traits such as high growth rates, disease resistance, or superior milk production.

AI offers several advantages, including the ability to use semen from genetically superior males regardless of geographical location, disease control by minimizing contact between animals during mating, and increased reproductive efficiency through the use of synchronized estrus protocols.

ET involves the removal of embryos from a genetically superior female (donor) and their transfer to one or more recipient females for gestation.

Donor females are typically selected based on their genetic merit, such as high milk production, superior meat quality, or disease resistance.

This technology allows for rapid genetic improvement by increasing the reproductive capacity of elite females and bypassing the limitations of natural mating.

ET also facilitates the propagation of valuable genetic lines and allows for the preservation of genetic diversity within a population.

Genetic selection involves the identification and breeding of animals with desirable traits to improve the overall genetic makeup of a population.

Traits targeted for selection may include growth rate, feed efficiency, carcass quality, milk production, disease resistance, and reproductive performance.

Selection methods include pedigree analysis, phenotypic evaluation, and increasingly, molecular genetic techniques such as DNA marker-assisted selection and genomic selection.

Through careful selection of breeding stock and the use of advanced breeding technologies, genetic progress can be accelerated, leading to more productive and resilient livestock populations.

Proper nutrition is essential for maximizing the genetic potential of livestock and ensuring optimal reproductive performance, growth, and health.

Nutritional management strategies may include formulating balanced diets tailored to the specific nutritional requirements of different classes of livestock, such as breeding animals, growing animals, and lactating animals.

Nutritional management also involves optimizing feed efficiency, minimizing waste, and utilizing alternative feed sources to reduce production costs and environmental impact.

Advancements in feed formulation, precision feeding technologies, and feed additives contribute to improved nutrient utilization, growth rates, and overall animal health.

Overall, intensive breeding technologies, including artificial insemination, embryo transfer, genetic selection, and nutrition management, play critical roles in enhancing livestock productivity, genetic diversity, and sustainability in modern agricultural systems. These technologies enable producers to efficiently produce high-quality animal products to meet the growing demands of a global population.

Table 1

Live weight of 6-month-old foals in experimental groups and Exter'er indicators

Specification	Groups					
	I (n=12)		II (n=12)		III (n=12)	
	X±Sx	Cv, %	X±Sx	Cv, %	X±Sx	Cv, %
Live weight, kg	137,6±0,36	0,90	139,2±0,46	1,14	141,1±0,26	0,64
Crow height, cm	118,1±0,48	1,42	120,3±0,36	1,02	121,5±0,48	1,38
Breast circumference, CM	120,5±0,40	1,15	121,2±0,52	1,49	123,7±0,47	1,31
Body length oblique, CM	116,2±0,51	1,51	117,6±0,50	1,47	118,9±0,71	2,07
Palm Circle, sm	12,0±0,21	6,15	12,5±0,17	4,76	12,9±0,23	6,14

* $P>0,95$; * $P>0,99$; *** $P>0,999$

Table 1 reveals that the colts in group III exhibited the highest live weight. Despite similar birth weights among the foals, those in group III surpassed their counterparts in groups I and II by 3.5 kilograms and 1.9 kilograms, respectively, attributed to their pasture upbringing as opposed to confinement in stall (cage) or stable conditions. Group II foals, maintained in stables, weighed 1.6 kilograms more than their group I counterparts. Moreover, group III foals demonstrated superior external traits compared to groups I and II. Withers height, chest circumference, trunk length, and hoof circumference of group III foals exceeded those of groups I and II by varying margins. Group II foals also exhibited greater dimensions than group I foals, albeit to a lesser extent. Notably, there was negligible disparity in live weight and primary body dimensions among the six-month-old foals in the experimental groups, suggesting initial similarity in these metrics at the study's commencement.

Conclusion

The findings underscore the pivotal role of intensive breeding technology in elevating the quality and performance of Karabair horses in Uzbekistan's highlands. As elucidated in Table 1, the colts in group III displayed remarkable superiority in live weight compared to their counterparts in groups I and II. Despite commensurate birth weights, the group III foals outpaced group I and II foals by 3.5 kilograms and 1.9 kilograms, respectively. This notable advantage is attributed to their upbringing in pastoral settings, contrasting with the confined conditions of stalls or stables experienced by groups I and II.

Moreover, the study unveils that group III foals exhibited not only superior live weight but also enhanced external characteristics compared to groups I and II. Measurements such as withers height, chest circumference, trunk length, and hoof circumference were notably greater in group III foals, further highlighting the benefits of intensive breeding practices.

Although group II foals, reared in stable environments, displayed greater dimensions than their group I counterparts, the margin was less pronounced compared to the advantages observed in group III. Nevertheless, it's noteworthy that there was minimal disparity in both live weight and primary body dimensions among the six-month-old foals in the experimental groups, indicating a level playing field at the study's outset.



These findings underscore the significance of employing intensive breeding technology to optimize the genetic potential and overall quality of Karabair horses, particularly in the challenging terrain of Uzbekistan's highlands.

Overall, these findings hold significant implications for horse breeding practices and breed conservation efforts, advocating for the widespread adoption of intensive breeding technologies to maximize the genetic potential and overall quality of horse breeds, particularly in challenging environments such as Uzbekistan's highlands. By leveraging these innovative approaches, breeders can contribute to the preservation and enhancement of valuable equine populations, ensuring their continued resilience and adaptability in the face of evolving environmental and socio-economic pressures.

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