INFLUENCE OF GOAT HOUSING IN HOT CLIMATE CONDITIONS ON PRODUCTIVITY AND PHYSIOLOGICAL STATUS

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Abstract: This article analyzes the influence of high summer temperatures on the physiological status and productivity of goats. The physiological changes caused by heat stress, the reasons for the decline in meat productivity, and the zoohygienic, nutritional, and management measures aimed at mitigating them are described. Scientific and practical recommendations suitable for the climatic conditions of Uzbekistan are proposed to ensure the effective housing of goats.

Keywords: goat, hot climate, heat stress, productivity, physiological status, feeding, housing, microclimate, zoohygiene.

Introduction

Today, as a result of global climate change, a sharp increase in air temperature during the summer months is being observed in many regions of the world, including the Republic of Uzbekistan. In the desert and steppe regions of the country, the air temperature frequently rises to **40–45°C**, which exerts a highly negative impact on the goat breeding sector [2;3;4].

Although goats are considered much more resilient to hot climates compared to other farm animals, prolonged exposure to high temperatures and humidity causes severe physiological stress in their organisms. Consequently, feed intake decreases, the demand for water increases, metabolism is altered, and overall productivity declines.

In recent years, developing technologies aimed at reducing heat stress in livestock has become one of the most urgent issues in animal husbandry. In particular, proper housing, feeding, and care of breeding goats during the hot summer days are crucial factors in achieving high economic efficiency [1;5].

The purpose of this article is to analyze the physiological changes occurring in the goat's body under hot summer climate conditions and to develop scientifically based recommendations for maintaining stable productivity.

The Influence of Heat Stress on Productivity

Excessively high air temperatures during the summer months adversely affect goat productivity. Under the influence of high temperatures, the animal's body expends more energy to maintain its core body temperature at a normal level. As a result, feed intake decreases, metabolic disturbances occur, and productivity drops.

- **Meat Productivity:** In meat-producing goats, weight gain slows down due to reduced feed intake. The efficiency of utilizing dietary nutrients decreases, and muscle tissue development is restricted, leading to a direct decline in meat yield.
- **Reproductive Performance:** In breeding goats, heat stress negatively affects reproductive functions. This is manifested by disrupted estrus cycles, reduced conception rates, an increased risk of embryonic mortality, and higher abortion rates. In male goats (bucks), semen quality and sperm motility decrease, thereby reducing fertilizing capacity.

• **Development of Young Kids:** Kids are far more sensitive to heat stress than adult goats. High temperatures reduce their feed intake, slow down their growth rates, and weaken their immune systems, resulting in an increased susceptibility to various infectious diseases.

Nutritional Principles of Goats in a Hot Climate

High summer temperatures directly affect the feed intake of goats. To reduce metabolic heat production, animals instinctively consume less feed, leading to energy and nutrient deficiencies. This ultimately results in reduced body weight gain and lower reproductive performance.

To mitigate these issues, feeding practices should adapt to the following standards:

• **Ration Composition:** During the hot season, the ration must be formulated using highly digestible feeds. It is recommended to include high-quality hay, green fodder, silage, haylage, and energy-rich concentrate feeds in balanced proportions. The use of unhygienic or moldy feed is strictly prohibited, as it further exacerbates the physiological impact of heat stress.

• **Feeding Schedule:** The main feeding sessions should be carried out during the cooler parts of the day: in the morning (**05:00–08:00**) and in the evening (**18:00–21:00**). Feeding is highly discouraged during the hottest hours of the afternoon, as feed intake significantly decreases during this period.

• **Water Requirements:** Water is an essential factor for metabolism, thermoregulation, and proper digestion. During the summer, the water requirement of goats increases **2 to 3 times** compared to normal periods.

- When the temperature reaches **35–40°C**, adult goats consume an average of **8–12 liters** of water per day.
- High-producing goats can require up to **12–18 liters** of water per day.

Zoohygienic Principles of Housing Goats in a Hot Climate

Zoohygiene is the branch of science aimed at maintaining the health of farm animals, creating a living environment that meets their physiological needs, and ensuring high productivity. Adhering to zoohygienic requirements under hot climate conditions is one of the key factors in preventing heat stress, protecting animal health, and maintaining productivity.

High summer temperatures intensify the process of thermoregulation in the animal's body. If housing conditions are inadequate, heat accumulation leads to severe heat stress. Therefore, establishing a comfortable microclimate in the housing facilities is essential.

1. Building Design and Location

Farm buildings should ideally be constructed in areas with natural ventilation, minimized direct sunlight exposure, and good air exchange. Positioning buildings in an **east-west direction** helps reduce direct solar radiation on the walls. The roof should be built using materials with low thermal conductivity or treated with heat-reflective coatings.

2. Microclimate Control

Microclimate indicators directly affect the physiological state of goats.

• **Indoor Air Temperature:** Ideally maintained between **18–25°C**.

• **Relative Humidity:** Kept at **60–70%**.

• **Air Movement:** Maintained around **0.3–1.0 m/s**.

During extremely hot summer days, using fans, natural or artificial ventilation systems, and misting (spraying) methods is highly effective in improving the indoor microclimate.

3. Density and Space Allocation

Providing sufficient space for goats to move and rest is crucial. Overcrowding leads to an increase in ambient temperature, poor air quality, and an elevated risk of disease transmission. Therefore, adequate floor space must be allocated for each goat according to zooveterinary standards.

4. Pasture and Outdoor Management

It is not recommended to keep goats under direct sunlight for long periods during the hottest hours of the day. Utilizing tree shade in pastures or installing artificial sunshades is highly effective. Goats kept in open pens must have continuous access to clean, cool, and fresh drinking water.

5. Sanitation and Hygiene

An important part of zoohygienic measures is compliance with sanitary regulations. This requires regular cleaning and disinfection of buildings and equipment, preventing excessive moisture build-up, timely removal of manure, and keeping feeding and watering troughs clean. These measures prevent infectious and parasitic diseases.

Conclusion

In conclusion, housing goats in accordance with scientifically based zoohygienic requirements in the hot and arid climate of Uzbekistan significantly reduces the negative consequences of heat stress. This serves as a vital prerequisite for strengthening animal health, increasing milk, meat, and breeding productivity, improving feed efficiency, and elevating the overall economic profitability of goat farming enterprises.

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