RAISING HU SHEEP: IS IT POSSIBLE IN ROMANIA?

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Abstract: *Originated from Mongolian sheep after a long process of acclimatisation and artificial selection, the Chinese Hu sheep is valued for its features: adaptability to hot and humid climate, all-year-round cycling, a-seasonal breeding, early sex maturity, fast growing, prolificacy, wavy lambskins (still retained after processing), and white coarse wool (with heterotypical fibbers). They are raised indoors all year round. Scientists have focused on Hu sheep derma papilla cells, differentially abundant proteins, genetic diversity, genome resequencing, genome-wide association, growth traits, homozygosity, ovarian DNA, phenotype traits, pleomorphic adenoma gene 1, selection signature, and skeletal muscle development. The authors of this paper investigate these research topics aiming at identifying ways of acclimatizing this sheep breed in Romania.*

Key words*: Hu sheep, Romania, features, research topics, acclimatisation.*

INTRODUCTION

Hu sheep are a Chinese indigenous breed known for their unique key features [4]:

- Adaptability [12,13,14,16,17] ("the quality of being able to adjust to new conditions" [2]): Hu sheep are well-suited to hot, humid climates and are raised indoors all year round [5,18];

- Economic importance ("the significance or impact that a particular industry, sector, company, or policy has on the overall economy" [2]): Hu sheep lambskins are a traditional export item from Zhejiang and Jiangsu provinces;

- Origin ("the point or place where something begins, arises, or is derived" – Oxford Languages): Hu sheep originated from Mongolian sheep and were introduced to the Taihu Lake Basin (31°14′0″ N) in China;

- Physical characteristics / traits ("observable features of an organism, such as size, colour, shape, etc., determined by genes and environmental influences" – Fiveable): Hu sheep have big, drooping ears, protruding eyes, a convex nose line, white and coarse wool with distinctive wave-like stripes in lambskins;

- Reproductive traits ("complex quantitative traits involving multiple genes, loci and interactions" – Reproductive Traits): Hu sheep exhibit early sexual maturity, a-seasonal breeding, and high fecundity, with ewes lambing twice a year. [1,9,10,12]

MATERIALS AND METHODS

The material used in this paper consists in a corpus of articles on Hu sheep published in the last five years. Through this scientific approach is pursued the adaptability of Hu sheep to the conditions in Romania by studying some parameters such as adaptability, economic importance, origin, psychological and reproductive traits. The research method used is corpus analysis.

RESEARCH RESULTS

1. Adaptability. Hu sheep are known for their remarkable adaptability, which allows them to thrive in various environments [5,11,19,23]:

- ***A-seasonal breeding***: Hu sheep can breed year-round, which is advantageous for continuous production;

- ***Climate adaptability***: Hu sheep are well-suited to hot, humid climates, making them ideal for regions like the Taihu Lake Basin (31°14′0″ N) in China, as well as adaptable to arid, high-altitude environments, such as the Tibetan Plateau (33°0′0″ N, and 1,500-5,000 m altitude) [5];
- ***Early sexual maturity***: Hu sheep reach sexual maturity early, allowing for more frequent breeding cycles and higher reproductive rates [8];
- ***Genetic diversity***: Hu sheep have a high level of genetic diversity, which contributes to their ability to adapt to different environments and resist diseases [1,3,5,9,11,22,23];
- ***High fecundity***: Hu sheep are known for their high reproductive performance, often giving birth to multiple offspring per pregnancy [1,10,23].

2. Economic importance. Hu sheep hold significant economic importance, particularly in regions like Zhejiang and Jiangsu provinces in China [3,11,20]:

- ***Genetic diversity***: Hu sheep's genetic diversity enhances their adaptability and resilience, making them a robust choice for sustainable farming [1,3,8,9,11,19,20,21,22,23];
- ***Lambskins***: Hu sheep lambskins are a traditional export item, known for their distinctive wave-like stripes, which are highly valued in the textile industry;
- ***Meat production***: Hu sheep are primarily bred for meat, and their high fecundity and early sexual maturity make them a valuable breed for meat production [1,4,7,18,19,21];
- ***Reproductive efficiency***: Hu sheep's high reproductive performance, including a-seasonal breeding and multiple offspring per pregnancy, contributes to higher productivity and economic returns for farmers [8,23].

3. Origin. Hu sheep are a Chinese indigenous breed with roots dating back to the *Ming Dynasty* (an imperial dynasty of China – 1368-1644 – following the collapse of the Mongol-led Yuan Dynasty) and *Qing Dynasty* (a Manchu-led imperial dynasty of China – 1644-1912 – and the last Chinese imperial dynasty). They originated from Mongolian sheep and were introduced to the Taihu Lake Basin (31° 14′ 0″ N) in China. Over the centuries, they adapted to the hot, humid climate of the region, developing their unique characteristics and high reproductive performance [5,8,9,10].

4. Physical traits. Hu sheep have some unique physical traits that set them apart:

- ***Big, drooping ears***: Hu sheep's distinctive ears give them a recognizable look.
- ***Compact, hardy body***: Hu sheep have a robust build, well-suited for different environmental conditions.
- ***Convex nose line***: Hu sheep's nose line gives their faces a unique profile.
- ***Protruding eyes***: Hu sheep's eyes are more prominent compared to other breeds.
- ***White, coarse wool***: Hu sheep's wool is known for being white and coarse, with lambskins often displaying distinctive wave-like stripes.

5. Reproductive traits. Hu sheep are known for their impressive reproductive traits [8]:

- ***Early sexual maturity***: Hu sheep reach sexual maturity at a young age, which allows for more frequent breeding cycles.
- ***High fecundity***: Hu sheep can produce multiple offspring per pregnancy, often having twins or triplets [1,23].
- ***A-seasonal breeding***: Hu sheep can breed throughout the year, unlike many other sheep breeds, providing continuous production.
- ***Short gestation period***: Hu sheep's gestation period is relatively short, allowing for quick turnaround between breeding cycles.

- ***Strong maternal instincts***: Hu ewes are attentive mothers, which contributes to higher survival rates of lambs [3].
- ***Adaptability*** traits make Hu sheep a valuable breed for farmers looking to maintain productivity in diverse and challenging conditions.
- ***Economic importance*** factors – *genetic diversity*, *lambskins*, *meat*, ***reproductive efficiency***, and ***wool*** – make Hu sheep an economically important breed, supporting both local and international markets (Figure 1).

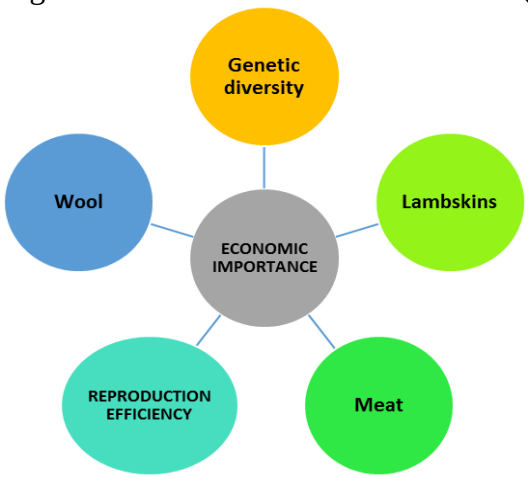

Figure 1. Hu sheep economic importance factors
Sorce: *own source*

- Hu sheep's ***origin*** (Taihu Lake Basin, 31°14′0″ N) makes it adaptive to the climate conditions in Romania (44°25′0″ N);
- ***Physical traits*** make Hu sheep easily identifiable and adaptable.
- ***Reproductive traits*** make Hu sheep highly productive and valuable for farmers looking to maximize their breeding programs [1,3,8,23] (Figure 2).

Sorce: *own source*

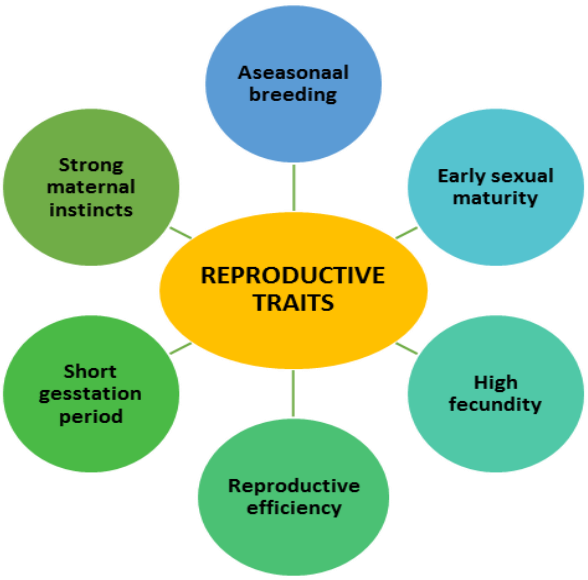

Figure 2. Reproduction characteristics / traits in Hu sheep
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CONCLUSIONS

Adapting Hu sheep to the conditions in Romania would involve several steps to ensure their well-being and productivity: breeding programs, i.e., utilising selective breeding to enhance traits that are beneficial for the Romanian environment, such as disease resistance and adaptability to local forage; climate acclimatization, i.e., gradually introducing Hu sheep to Romania's climate, allowing them to acclimate to temperature variations and humidity levels; health monitoring, i.e., implementing regular health checks to monitor for any signs of stress or illness, ensuring early intervention, if needed; nutritional adjustments, i.e., providing a diet that meets their nutritional needs, considering the availability of local feed resources, and supplementing with additional nutrients, if necessary; pasture management, i.e. ensuring access to high-quality pastures and managing grazing to prevent overgrazing and maintain soil health; shelter and comfort, i.e., providing adequate shelter to protect them from extreme weather conditions, such as heavy rain or extreme heat. Thus, Hu sheep could be successfully integrated into Romania's farming systems, contributing to the local economy and agricultural diversity.

Raising Hu sheep in Romania could offer several benefits:

- Adaptability: Hu sheep are well-suited to various climates, including moderate climate conditions, making them adaptable to Romania's diverse environments;
- Economic value: Hu sheep's meat and lambskins are valuable commodities, potentially boosting local economies and providing export opportunities;
- Genetic diversity: Introducing Hu sheep can enhance the genetic diversity of Romania's sheep population, improving resilience and adaptability;
- High reproductive performance: Hu sheep early sexual maturity and high fecundity can lead to increased productivity and more frequent breeding cycles;
- Sustainability: Hu sheep ability to thrive in different conditions with minimal inputs can contribute to sustainable farming practices.

These factors make Hu sheep a promising option for Romanian farmers looking to enhance their livestock operations.

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