UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA
"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES"

05-06 November 2026



GENETIC CONSERVATION OF INDIGENOUS / LOCAL AND ENDANGERED / LIMITED-NUMBER / RARE SHEEP BREEDS

IULIA MUNTEANU[1], ANA-GINA ARMAȘ[1], LOREDANA VĂDUVA[2*], IOAN PETROMAN[1], NICOLETA HĂDĂRUGĂ[3]

[1] *Development Research Station for Raising Sheep and Goats, S.C.D.C.O.C. Caransebeș*

[2] *University of Life Sciences "King Mihai I", Faculty of Management and Rural Tourism, Timisoara*

[3] *University of Life Sciences "King Mihai I", Faculty of Food Engineering, Timisoara*

*Corresponding author's e-mail: loredanavaduva@usvt.ro

Abstract: *This paper examines the genetic conservation of two major categories of Romanian sheep breeds: indigenous / local breeds and endangered / limited number / rare breeds. Indigenous breeds are defined by ecological adaptation, historical formation, and reproductive isolation, while endangered breeds are defined by demographic fragility and risk of extinction. The study highlights Romania's high genetic diversity, with breeds such as Rațca, Teleorman Negru, Țigaie, and Țurcană, exhibiting robust polymorphism but facing increasing risks of genetic erosion. Endangered breeds show elevated inbreeding coefficients, fragmented populations, and low effective population sizes requiring urgent intervention. Conservation strategies include controlled reproduction, cryopreservation, genetic monitoring, reproductive isolation, and sustainable economic valorisation. The paper concludes that endangered / limited-number / rare sheep breeds represent critical genetic resources, threatened by inbreeding, loss of ecological adaptations, reduced herds, and uncontrolled crossbreeding. Overall, the study emphasizes the strategic importance of safeguarding both categories to ensure long term breed viability to preserve Romania's zoo genetic heritage.*

• Introduction

The essential difference between indigenous / local sheep breeds and endangered / limited-number / rare sheep breeds is conceptual: the first one describes the origin and formation of a population (i.e. a sheep breed adapted to the local environment, historically formed in a certain region, and reproductively isolated), the second one, the demographic state and the risk of extinction (i.e. a sheep breed with herds below the critical threshold, no matter its origin). Therefore, the two categories may overlap, but are not synonymous.

An indigenous / local sheep breed is defined by ecological adaptation, origin, and reproductive isolation. According to genetic studies, Romania has a high diversity of local breeds (Merinos de Palas – which, although improved, has a local origin –, Rațca, Teleorman Negru, Țigaie, Țurcană), characterized by adaptation to specific climate and relief and high genetic polymorphism. These sheep breeds are adapted to hilly, mountain, or plain pastures; are formed in the Carpathian area or in Romania; are reproductively isolated ≥ 5 generations; present stable morpho-productive traits (e.g. the meat-milk-wool balance in Țigaie, the rusticity of Țurcană).

An endangered / limited-number / rare sheep breed describes the number of animals and the risk of extinction. Such a breed becomes rare when it has a very restricted geographical distribution; when it is no longer economically competitive and is abandoned by breeders; when the herds fall below the critical limits established in conservation programs; and when there is high inbreeding. This is a status that can affect improved or imported breeds (if they end up being poorly bred), or local breeds (e.g. Rațca, Teleorman Negru – reduced herds).

In conclusion, all indigenous / local sheep breeds are not endangered / limited-number / rare, but all endangered / limited-number / rare sheep breeds may be indigenous / local. "Indigenous / local" describes cultural and genetic identity, "endangered / limited-number / rare" describes the risk of extinction and the need for intervention.

• Material and method

The material used in this paper consists in articles published during the period 2000-2025. The research method is the bibliographic one and it aims at identifying the specifics of both indigenous / local sheep breeds and endangered / limited-number / rare sheep breeds from a conservation / preservation perspective.

• Results and discussion

Endangered / limited-number / rare sheep breeds can be characterized, from a genetic point of view, as follows: Rațca – genetic status: high level of polymorphism, but the population is fragmented into small nuclei; low effective population size → risk of inbreeding and loss of lines; old, indigenous breed, with clear genetic differentiation from Țigaie and Țurcană and; genetic risks: accelerated genetic drift; extremely low numbers (< 1000); vulnerability to accidental crosses with Țurcană; conservation priorities: creation of reproductively isolated nuclei; gene bank (semen); identification and preservation of old lines. Teleorman Negru – genetic status: adapted to southern Romania → valuable ecological traits; rare local breed, well genetically differentiated; relatively stable genetic structure, but very low effective population size; genetic risks: inbreeding in isolated nuclei; loss of adaptive traits through uncontrolled crosses; numbers < 500 → critical risk; conservation priorities: controlled breeding with ram rotation; expansion of pedigree registers; ex situ conservation (cryopreservation). Țurcană Bucălaie, Țurcană Oacheșă, and Țigaie Roșie (old variety) – genetic status: • present distinct genetic structure, but threatened by: o crosses with improved lines; o loss of traditional phenotypes; o absence of pedigree registers; genetic risks: dilution of breed identity; loss of local adaptations (resistance, rusticity); populations below the minimum threshold for conservation; conservation priorities: creation of conservation micronuclei; identification and certification of varieties; periodic genetic monitoring. Cluj Merino and Transylvanian Merino, improved breeds that have become rare – genetic status: distinctive genetic structure, result of selection in the 20th century; improved breeds, but with historical and genetic value; genetic risks: loss of original improved lines; replacement with imported Merino; very small herds (< 1000).

• Conclusions

The analysis above demonstrates that Romanian sheep genetic resources fall into two distinct, yet partially overlapping categories: indigenous / local sheep breeds and endangered / limited number / rare sheep breeds, each requiring tailored conservation strategies. Indigenous / local sheep breeds represent a historically formed genetic heritage, defined by ecological adaptation, high polymorphism, and reproductive isolation, but increasingly threatened by genetic erosion and uncontrolled crossbreeding.