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PAPESHE

Deliverable 4.1.1 Nucleus farm of Pelagonia sheep

Project acronym: **PAPESHE**

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Key information

Authors of this Report	**Georgios Arsenos[1], Vasileia Fotiadou[1], Alexandros Theodoridis[1]** *[1] Aristotle University of Thessaloniki (AUTH)* *Correspondence: arsenosg@vet.auth.gr*
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Abstract

The sheep production sector in the cross-border area is characterised by a loss of indigenous genetic resources, which challenges its competitiveness and overall sustainability. Conservation and genetic improvement of Pelagonia breed could help towards tackling such challenges, while also being important for the cultural heritage of the area. Taking into consideration these issues, initiatives for the creation of a nucleus of Pelagonia sheep were undertaken within PAPESHE project. A total of 14 purebred Pelagonia lambs that were resistant to scrapie and sero-negative to maedi-visna disease were selected from the farm of the Research Institute of Animal Science in Giannitsa. Selected animals were transferred to the facilities of the Aristotle University of Thessaloniki (AUTH) and housed in a specially designed large area equipped with new installations for animal grouping, feeding and watering. Animal adaptation, health and welfare were closely monitored by a team of qualified veterinarians. The created nucleus currently consists of two rams, four ewes and seven female lambs; one female lamb died shortly after its transportation to the new premises. In the near future, animals will be mated and ewes' performance will be monitored. Moreover, seven more female lambs will be selected to join the nucleus. Current and future actions support the conservation and genetic improvement of Pelagonia breed and are expected to increase the sustainability of the sector in the cross-border area.

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1. Introduction

The sheep production sector in the cross-border area faces a number of economic, social and environmental challenges, which threaten its viability. One of the most important issues is the loss of invaluable autochthonous genetic material due to massive imports of foreign sheep breeds and uncontrolled cross-breeding with indigenous ones (Christodoulou et al., 2007, Argyriadou et al., 2020).

Pelagonia sheep breed used to be reared in high numbers in the mountainous less favoured areas of the cross-border area. This breed was highly appreciated for its adaptability, resistance to disease, relevantly high prolificacy rate and low lamb mortality rate (Ploumi et al., 1997, Christodoulou et al., 2007). However, today the breed is considered as endangered with only a small number of purebred Pelagonia sheep being reared (Χριστοδούλου, 2016).

The conservation and genetic improvement of Pelagonia breed could help to increase the sustainability of the sheep sector in the cross border area by promoting the production of high quality and environmentally-friendly traditional products (Georgoudis et al., 2011). Towards this end a strategic approach is required. Previous research has shown that successful conservation and breeding programs rely on a three-tier pyramid structure. In this structure, the first tier is the formation of a nucleus of high improvement potential animals. This elite group is reared under controlled conditions with high welfare standards that accelerate the breeding process and allow the animals to reach their full potential. High breeding value sires produced from the nucleus can then be used for breeding purposes in the second tier and from there to the third (Argyriadou et al., 2020).

In Greece, a nucleus farm of a small number of Pelagonia sheep already exists in the Research Institute of Animal Science of the Hellenic Agricultural Organisation DEMETER (RIAS). However, the formation of a second nucleus is considered necessary in order to (i) protect the existing population from external threats and therefore, safeguard the conservation of the breed, (ii) accelerate the genetic improvement process, (iii) generate a genetic material bank and (iv) allow for future experimental actions.

Taking into consideration the issues above, part of PAPESHE project activities was the formation of a new nucleus farm of Pelagonia sheep in the establishments of the Aristotle University of Thessaloniki (AUTH) in Kolhiko, Greece. This activity (Deliverable 4.1.1) underpins the following objectives of the project:

- Establishment of the necessary infrastructure for genetic improvement initiatives in the cross-border area, contributing to the mitigation of genetic diversity loss.
- Improvement of the quality and hygiene of milk and dairy products from autochthonous breeds in the cross-border area.
- Promoting networking among actors in the cross-border area in order to achieve synergies in increasing the quality of sheep farmer education.

2. Methodological approach

2.1. Selection of animals and housing preparations

Purebred Pelagonia lambs were selected from the farm of RIAS located in Paralimni, Giannitsa to be transferred to the University farm of AUTH in Kolhiko, Thessaloniki (Figure 1). Selection was performed during three consecutive years corresponding to lambings between December 2018 – January 2019, December 2019 – January 2020, and September 2020 – January 2021. Specifically, after each lambing period, blood samples were taken from all available lambs and genotyping was performed for resistance to scrapie disease. Moreover, blood samples were taken from their mothers and serological testing (ELISA) was performed for maedi-visna disease. Only, resistant to scrapie lambs (homozygous for the ARR allele) born from sero-negative to maedi-visna ewes were selected for the new nucleus farm (n=14). Selected animals were vaccinated for brucellosis prior to their transportation to the new premises.

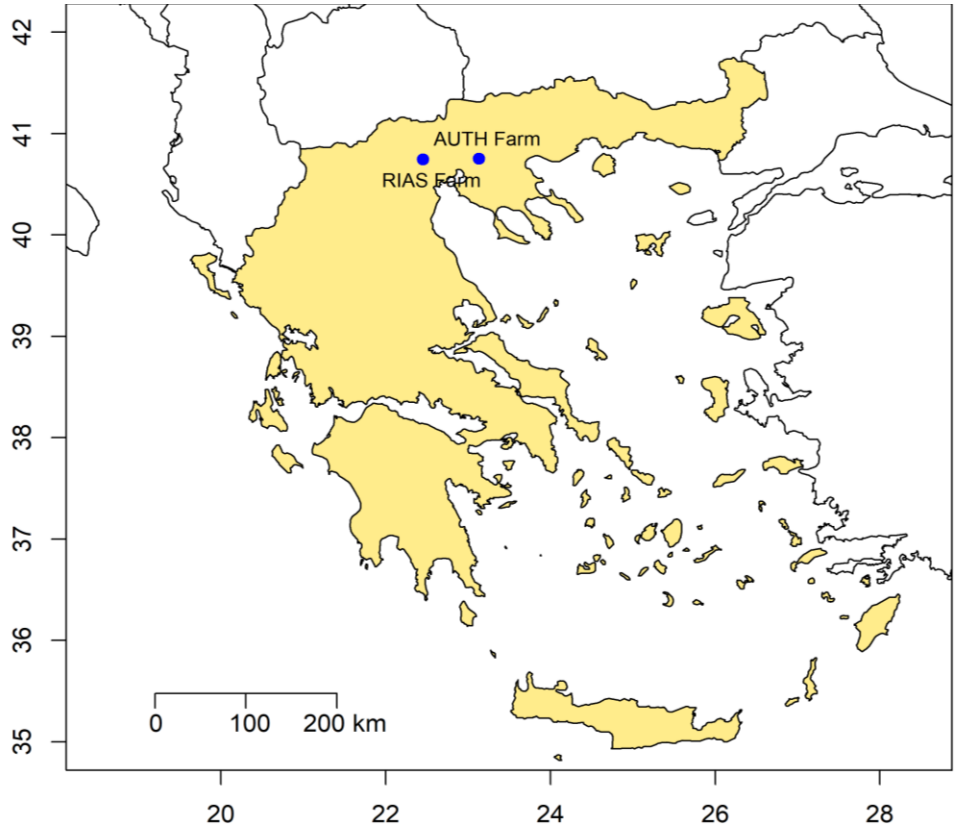

Figure 1. Map of Greece illustrating the location of RIAS and AUTH farms.

Figure 2. Blood samplings in Pelagonia lambs.

In terms of housing, a large area was organised at a sufficient distance from the rest of the animals (Chios sheep) reared in the same premises. The area was equipped with newly bought separators for animal grouping as well as feeders and waterers (Figure 3).

Figure 3. Animal housing equipment installations in AUTH University farm.

2.2. Animal handling upon arrival, adaptation, health and welfare

Selected animals were transferred to AUTH farm in two rounds:

- Round 1: animals selected from the first and second lambing (n = 7)
- Round 2: animals selected from the third lambing (n = 7)

Upon arrival and before landing, the hooves of each animal were inspected and any mud and/or manure were removed. Moreover, if needed, hoof trimming was performed (Figure 4). Then, all animals' hooves were disinfected with a betadine surgical scrub solution (Figure 5). All the above practices were performed by qualified veterinarians. After landing, animals were transferred in the specially designed area described in subsection 2.2 (Figure 6).

The everyday management of the nucleus flock was performed by trained technical staff. Frequent monitoring of animals' adaptation, health and welfare was performed by AUTH team veterinarians. Specifically, general behaviour and socialising, hygiene and adaptation to the new nutritional management were evaluated. To evaluate nutritional management body condition scoring was performed and adjustments were incorporated accordingly. Moreover, at the age of six to seven months old males were separated from the females.

Figure 4. Hoof inspection, cleaning and trimming.

Figure 5. Disinfection of hooves with betadine surgical scrub solution.

Figure 6. Pelagonia sheep in AUTH farm on the day of their arrival; (a) and (b) correspond to round 1 and 2 of transportations, respectively.

3. Results

A nucleus of 14 purebred Pelagonia sheep was created in AUTH University farm. However, one female lamb died one week after its transportation without presenting any clinical symptoms. The cause of death was not determined since no authorised autopsy could be performed due to Covid-19 measures. Therefore, the nucleus currently consists of two males (15 months of age) and 11 females from which four are ewes (15-27 months of age) and seven are lambs (2-6 months of age, Table 1, Figure 7).

Given that strict selection criteria were applied regarding resistance to scrapie disease, the initial goal of a total of 20 animals was not reached. However, the selection process applied safeguards the overall health of the nucleus and guarantees its future viability. Finally, during the previous reproduction period (May to June 2020) available animals were not mated since most of them had not reached the appropriate age; males and two out of four available females were 5 to 6 months old (Table 1).

Table 1. Data of the purebred Pelagonia sheep comprising the nucleus in AUTH farm.

Ear tag	Sex	Date of birth	Genotype for scrapie resistance	Maedi-visna serological testing
593019548741	Male	12/2019	ARR/ARR	Negative
593019549488	Male	12/2019	ARR/ARR	Negative
593019548243	Female	12/2018	ARR/ARR	Negative
593019548250	Female	12/2018	ARR/ARR	Negative
593019549223	Female	12/2019	ARR/ARR	Negative
593019549367	Female	12/2019	ARR/ARR	Negative
593035209763	Female	09/2020	ARR/ARR	Negative
593035209714	Female	09/2020	ARR/ARR	Negative
593035209707	Female	09/2020	ARR/ARR	Negative
593035209776	Female	10/2020	ARR/ARR	Negative
593035200001	Female	12/2021	ARR/ARR	Negative
593035200136	Female	01/2021	ARR/ARR	Negative
59303520172	Female	01/2021	ARR/ARR	Negative

Figure 7. Ewes (a), rams (b) and lambs (c) comprising the nucleus of Pelgonia breed in AUTH farm.

4. Future steps

AUTH team will liaise with RIAS in order to select seven more female lambs that will be suitable to join the new nucleus farm. Moreover, the first mating will be performed in May-June 2021 under controlled conditions and pregnancy will be confirmed using ultra-sound. All female lambs born will be kept to increase the size of the nucleus. Furthermore, monthly monitoring of the ewes' performance will be performed during the following lactation period. Finally, educational activities for interested livestock farmers will be performed.

5. Conclusion

The new nucleus of Pelagonia sheep in AUTH University farm supports the sustainability of the conservation initiatives, which were undertaken during PAPESHE project and will help to accelerate the genetic improvement process. In this regard, it is expected to underpin the economic viability and competitiveness of the sheep production sector in the cross-border area.

6. References

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