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Milking and reproduction management practices of transhumant sheep and goat farms

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Abstract. Transhumance is the seasonal movement of livestock and people between regions of different climate conditions aiming at a better development of grazed areas. Transhumant people move towards summer pastures in spring and spend 5 to 6 months in the uplands, where animals are kept outdoors or in makeshift facilities. The transhumant farming system in Greece is still practiced in many regions of the country. The purpose of this paper is to examine the prevailing management practices of this specific sheep and goat production system, especially concerning milking and reproduction. For this purpose data from a representative sample of transhumant farms from the Region of Thessaly were collected. Then, frequency analysis was used in order to reveal the main practices characterizing the system. The results highlight the persistence of traditional milking practices, with the domination of hand milking. At the same time a proportion of the farmers adapt improved ways of milking, such as the introduction of various types of milking machines, which are used during winter and sometimes during summer. This development illustrates that the intensification trend of animal production has also affected this predominantly extensive system. Concerning the reproduction management of the herds, farmers tend to introduce foreign dairy breeds in order to increase their farm outputs. Also, the majority of the farmers apply natural mating and only a few incorporate modern management practices such as oestrus synchronization.

Keywords. Transhumance – Sheep – Milk production – Reproduction – Herd management.

Les pratiques de gestion dans des élevages ovins et caprins transhumants

Résumé. *La transhumance des troupeaux entre les régions de différentes conditions climatiques vise à un meilleur développement des zones pâturées. Les troupeaux transhumants se déplacent au mois de mai vers les prairies d'été où ils passent 5 à 6 mois. Les animaux restent à l'extérieur ou dans des installations simples. Le but de cette étude est d'examiner les pratiques de gestion des systèmes de production ovine et caprine, en particulier concernant la traite et la reproduction. Les données d'un échantillon représentatif des exploitations transhumantes de Thessalie ont été recueillies. Ensuite, une analyse de fréquence a été utilisée pour révéler les pratiques principales caractérisant le système. Les résultats mettent en évidence la persistance de pratiques de traite traditionnelles, avec la domination de la traite à la main. Mais, une partie des agriculteurs adopte des méthodes de traite améliorées, telles que l'introduction de divers types de machines à traire, qui sont utilisés au cours de l'hiver et parfois durant l'été. Cette évolution montre que la tendance de l'intensification de la production animale a également affecté ces systèmes. En ce qui concerne la gestion de la reproduction, les éleveurs utilisent des races laitières afin d'augmenter leur production laitière. En outre, la majorité des agriculteurs utilise la reproduction par monte naturelle et seuls quelques-uns intègrent des pratiques modernes de reproduction telles que la synchronisation de l'œstrus.*

Mots-clés. *Transhumance – Moutons – Production laitière – Reproduction – Gestion du troupeau.*

I – Introduction

Transhumance, the annual movement of livestock between winter and summer rangelands, is still practiced nowadays in most parts of Greece and maintains its traditional character linked to certain ethnic groups (Ispikoudis *et al.,* 2002; Constantin, 2003) and the survival of rather traditional practices such as grazing, milking by hand and non-selective natural mating. The sheep and goat farming sector in the country has been developed during the past decades as many producers adopted modern management practices in order to satisfy the increasing market demand mainly for dairy products but also for meat. Specifically, the reproduction schedule of sheep and goat farms is usually designed so that the offspring are born and weaned in time to meet the increased market demand (McKenzie-Jakes, 2008) during Christmas and Easter holidays, when Greek consumers demand whole lamb and kid carcasses.

In order to achieve such goals, improvements in the reproduction management of farms have been proposed. A common one includes the preparation of ewes and dams by providing additional feed for two months during the breeding season, which improves the reproductive performance of the animals (increase of ovulation rate), and the simultaneous estimation of the body condition rate (McKenzie-Jakes, 2008; Martin and Karadowa, 2004). A method used to adjust the timing of mating is the “male effect”, referring to the sudden introduction of males in the herd in order to induce ovulation to reproductive quiescent females –for instance out of season or lactating– and it also advances the first cycle in young ewes and dams (Martin *et al.*, 2004). In the past few decades important improvements have been made in altering the reproductive process of the animals, of which oestrus synchronization allows for shortening of the breeding season by bringing all dams and ewes in oestrus at the same time. The synchronization is performed using vaginal progesterone pessaries, progesterone implants or prostaglandin injections (Freitas and Melo, 2010). Another method that alters the reproductive performance of the animals and is also suitable for the genetic improvement of the herd is artificial insemination (AI) combined with oestrus synchronization so that superior genetic material can be introduced in the flock (Martin and Karadowa, 2004; McKenzie-Jakes, 2008). While AI focuses on the performance of males, multiple ovulation and embryo transfer (MOET) intend to maximize the performance of genetically superior females (Freitas and Melo, 2010).

Apart from reproduction, milking is one of the most important aspects of sheep farm management and transhumant systems constitute no exception. During the past few years crossbreeding among local and foreign improved breeds has increased productivity, although threating local genetic diversity (Salazar *et al*., 2012). Better milk yields induced the introduction of milking machines in the production process, as they offer better working conditions to producers, improve milk quality and facilitate the monitoring of the health condition of the udder as well as the productivity of each animal.

The aim of this paper is to present the management practices of transhumant herds in Greece, especially concerning milking and reproduction, and to explore whether and to which extent its traditional character still remains. The prefecture of Thessaly, where the survey was conducted, has been used for centuries as winter domicile for transhumant herds. According to Syrakis (1925), in 1925 there were more than 600,000 transhumant animals in Thessaly, while in 2002, the transhumant sheep and goat population was almost reduced by half, reaching 320,000 animals (Laga *et al*., 2003).

II – Materials and methods

Based on a questionnaire which included questions about the reproductive scheduling of the herds, the potential use of techniques such as oestrous synchronization and artificial insemination, the use of milking machines (both during winter and summer) and the productive performance of transhumant sheep and goat herds, a survey was conducted in the Region of Thessaly,

where the majority of transhumant producers maintain their herds during winter (744 transhumant farms – 37.6% of transhumant farms in the country) (Laga *et al.,*2012) and the survey was administered to 121 producers, 16.3% of the total cohort.

III – Results and discussion

Among the 121 surveyed producers, 23.1% maintain only goats, 56.7% only sheep and the remaining 20.2% keep both sheep and goats in various proportions. Rams and bucks are kept separately and are introduced in the herd in late spring, usually when flocks arrive to summer rangelands. Commonly males are kept in the herd until November/December, after the return of flocks to the lowlands. The main kidding/lambing period is on November/ December, while late births occur mostly on February and March.

The mean age of admittance in reproduction is calculated at 14.35 months for young bucks and at 13.80 months for young rams. The same results for young ewes and dams vary and are presented in Table 1. The first mating for most of the females, either ewes or dams, occurs between the age of 9 and 12 months; nonetheless, females are introduced in reproduction after the age of 18 months in a considerable percentage of goat herds (32%). The average prolificacy is 1.35 lambs per lambing for sheep (standard deviation 0.23) and 1.40 kids per kidding for goats (standard deviation 0.30). These results reflect the influence of crossbreeding on both traits, age on reproduction and prolificacy. In particular, 62.50% of young ewes enter reproduction at the age of 9-12 months and the prolificacy is considerably improved, compared to the expected 1.0-1.3 of mountainous Greek breeds of sheep and goats (Lagka, 2005).

Table 1. Mating age of ewes and dams

Age	% Ewes	% Dams
9-12 months	62.50%	43.00%
12-15 months	30.10%	12.50%
15-18 months	2.40%	12.50%
>18 months	5.00%	32.00%

Crossbreeding between local and foreign breeds is very common in the extensive transhumant system. More than three out of four (76.5%) producers have tried to improve the productivity of their farms through crossbreeding, their main goals being the improvement of milk production followed by meat production and endurance to the harsh environment of mountainous pasturelands. On the other hand, only 23.5% maintain sheep and goats of Greek indigenous breeds, especially mountainous, either purebred or crossbreeds. It should be noted that the genetic improvement of herds through crossbreeding is mainly done with the introduction of males from improved breeds, either bucks or rams, in the reproductive procedure, while transhumant farmers rarely resort to the use of females (ewes and/or dams), which they buy from markets. The main Greek sheep breeds used for the improvement of transhumant flocks are Karagouniko and Chios (see Lagka (2005) for details), while Lacaune, Friesland and recently the Spanish Assaf sheep are the most popular foreign breeds. When it comes to goats, foreign breeds (Alpine, Zaanen and Damascus) are preferred by transhumant farms.

Transhumant farmers commonly prepare ewes and dams for the mating season by providing additional feed (74.4% of the questioned producers), while for the remaining 25.6% preparation is based only on grazing. When it comes to modern reproduction practices, only 3 out of the 121 transhumant producers of the sample had practiced oestrous synchronization in the past, with

the use of intravaginal progesterone pessaries, but none of them is willing to retry this procedure or to test other improvements, such as artificial insemination (AI). Possible reasons for this reluctance are the increased prolificacy rates (more than two lambs/kids per birth) resulting from AI, which decreases the quantity of marketed milk –the most important product of these farms– and the low price of meat.

When it comes to milking, the mean annual goat milk yield is calculated at 96.00 litres/dam (standard deviation 50.80 litres) and the mean annual sheep milk yield at 93.00 litres/ewe (standard deviation 39.10 litres) (Table 2). The high standard deviations and the broad difference between highest and lowest yields in both sheep and goat farms can be attributed to several reasons. Indeed, yields differ substantially because of the varying degree of crossbreeding in the herds. Furthermore, the application of a third milking per day, especially during the first milking period, commonly from Christmas until early March, increases yields up to 20%. Another parameter is the nutritional management of transhumant herds, as the nutritional requirements of the animals in the various stages of their production cycle are not always covered properly.

Table 2. Milk production of transhumant sheep and goat

Traits	Goat	Sheep
Mean milk yield (l)	96.00 ± 50.80	93.00 ± 39.10
Max milk yield (l)	224.00	180.00
Min milk yield (l)	24.00	32.00

The majority of the producers (85.5%) apply milking by hands and only 14.5% use milking machines; of the latter producers, only one uses a mobile milking machine, which can be transferred from winter to summer domiciles. The main causes for this are the low productivity of transhumant flocks as well as the cost of this improvement, both of which do not generally justify the use of milking machines.

IV – Conclusions

The results of this survey among transhumant farmers in Thessaly revealed that the higher market demand for dairy and meat products has affected the transhumant system, being one the main causes for the introduction, although slow, of modern management practices. The main improvement is the use of genetically improved animals, while mechanization of production, especially the use of milking machines, as well as use of techniques for reproductive improvement activity is limited.

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