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## **A Contribution to the Improvement of Milking and Working Conditions on Serrana Goat Farms in Northeastern Portugal**

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### **Summary**

This presentation is about milking and working conditions on Serrana goat farms in Trás-os-Montes, a region of northeastern Portugal. The Serrana goat is an indigenous breed and is generally raised to produce milk for cheese-making.

Goats are hand-milked inside their shelters. There are no places specifically for milking nor special equipment or facilities to do this work.

In collaboration with ANCRAS (Portuguese Serrana breeders' association), we developed a project with the aim of improving milking and working conditions on Serrana goat farms, bearing in mind the socio-economic conditions of breeders. We propose the use of a milking platform with a self-locking barrier in order to improve the posture of milkers and the efficiency of milking.

Our study compared traditional manual milking with manual milking using such a platform and barrier. The use of this equipment can improve milking and working conditions on the goat farms of the region.

### **1 Introduction**

The Serrana goat is the leading Portuguese local breed and is generally bred to produce milk for cheese-making. The flocks are small and raised according to extensive systems. While the breed population of the Serrana is small, it has great socio-economic importance for the northeastern Portuguese region of Trás-os-Montes due to the number of families that are economically dependent on raising goats. These small flocks, numbering from 80 to 100 animals, provide the economic support for many families in a region in which rural areas have experienced dramatic depopulation and exodus.

The farms on which the Serrana goat is raised are small and they rarely have suitable milking facilities. Goats are hand-milked inside the shelters in which they are housed during the night. Usually, there are no places specifically designated for milking and it is done in the straw-bedding area. As milkers perform their task, they remain in an awkward posture that makes milking stressful labor and potentially debilitating. In addition, conditions of cleanliness and hygiene tend to be poor and that affects the quality of the milk, and, consequently, that of the cheese.

The animal shed is one of the main sources of contamination, and the milking area of the shed needs special hygienic attention (Sinha, 2000). Moreover, manual milking is a hard, exhausting and unpleasant activity, which may cause pains in the back, arms and wrists (Vallerand, 1984). Through the improvement of milking and work conditions it will be possible to foster the increase in the number of goats per flock.

In order to improve milking conditions in this region, the traditional procedures will have to change. In addition, the physical condition of the places where milking is carried out must be improved. According to the census of 1999, in the region of Trás-os-Montes, there were only four goat farms out of 458 that had milking machines (three milking parlours and one mobile equipment). However, introducing changes is not easy, given there is some resistance and mistrust among breeders when it comes to new techniques and technologies. It is necessary to undertake extension and demonstration tasks to encourage the adoption of innovative methods which may create better milking conditions.

As stated, in collaboration with ANCRAS (Portuguese Serrana breeders' association), we conducted a project with the aim of improving milking and working conditions on Serrana goat farms. Our work has borne in mind the breeders' socio-economic conditions as well as their lack of enthusiasm for innovation, which may be due to their mistrust and lack of knowledge concerning such technologies.

The main goal of this project is an improvement in milking and working conditions of Trás-os-Montes goat farms, where breeders handle small flocks according to traditional extensive systems and do manual milking. Thus, the aim is to improve the bodily stance used in milking work and to increase cleanliness and hygiene in the course of milking by encouraging the use of a milking platform with a self-locking barrier, and by informing breeders about appropriate milking procedures.

## **2 The Serrana Goat Breed**

The Serrana goat is a Portuguese local breed, which is generally considered to originate from Serra da Estrela (a mountainous region in the Centre of Portugal) and to descend from the Capra Pyrenaica, or the goat of the Pyrenees, the European branch and antecedent of the Portuguese and Spanish goat breeds.

From the geographical point of view, this breed of animals can be found in the north and Centre of Portugal and it is still the goat breed that accounts for the greatest number of animals in the country. However, the number of animals of this breed has been dropping significantly, mainly in the inland areas of Portugal, since the 1950s. In fact, the number of goats decreased from 300 000 in the mid-20th century to 20 000 in 2003. This decrease is considered to have resulted from the wave of emigration that occurred in these regions, which led to the desertification of rural areas and to an enormous regression in both farming and animal raising.

In 1990, ANCRAS (the national Serrana breeders' association) was created. ANCRAS keeps the herd-book of this breed and it gives support to the breeders who are members of the association. Closely linked to the Serrana breed are two PDOs (Protected Designation of Origin): the Transmontano goat cheese PDO; and the Transmontano kid, or young goat, PDO.

In Trás-os-Montes, the Serrana breed goats are raised in extensive systems, according to traditional farming systems. Thus, the flock ranges through mountains and valleys, and are not given any extra food supplies in the shelters where they spend the night. Flocks are small. The

ANCRAS associates who possess more than 200 goats make up less than 5% of the total number and the average flock size ranges from 80 to 100 animals, varying according to the geographical area. Goats are raised both for meat and milk production. The kids are exclusively fed on maternal milk and are slaughtered when they are between four and eight weeks old.

Milk production varies a lot, depending both on the animal and on the flock. The average milk production per goat varies from 0,68 litres to 1,46 litres a day. In general, lactation can last between 165 and 180 days, and milk production (at 150 days) ranges from 103 to 223 litres.

Milk is used for cheese making, and it is estimated that the annual production of PDO cheese is 35 tons. The cheese that is produced is easily sold due to the demand, so, like in other countries (Billon et al., 1999), it is necessary to raise the number of animals per flock in order to increase milk production. It is expected that, in the future, there will be fewer but bigger Serrana goat flocks. Therefore, the use of new techniques is essential to reduce the time spent on milking.

### **3 Methodology: Putting the Project into Practice**

Using digital video recording, we studied milking conditions on three goat farms, with an emphasis on the posture of milkers; task performance; task time; working surfaces; and equipment and facilities. After the study and identification of deficiencies in the above, we designed a set of strategies to improve milking conditions on goat farms in Trás-os-Montes, focusing on equipment and facilities. These strategies comprise information, training, technical support, and, above all, demonstrations in the use of new equipment. The demonstration tasks are performed with two sets of equipment set up in two goat farms of the region. This equipment comprises a platform with a self-locking barrier, built according to the size of the Serrana goat, and the breeders receive training in how to use it.

We organize work visits for farmers from nearby villages, so that they can see and experiment the use of the platform and the self-locking barrier. Along with demonstration work, the project intends to develop several resources to spread information (such as leaflets, posters and demonstration videos displaying the milking process) aimed at the other breeders. The project also plans to produce resources for educational training in milking techniques and for publicizing the use of milking equipment.

Later in our project, we started demonstrating the use of milking machines on farms who had already adopted the platform with the self-locking barrier. For this purpose, a mobile milking machine with a milking unit was used. The option for this machine type is based on the cost, since it is more affordable for the goat breeders of this region.

As described, the project comprises several activities, but in this presentation our focus centers on two topics: the time spend to do tasks related to milking goats, and the problem of body posture while the milker is working.

### **4 Results and Discussion**

Studing the videos of manual milking, recorded at three goat farms, we take into consideration two major tasks performed by the milker: catching and holding the goat; and doing

hand milking. Also, we assumed that the two major problems that affect the conditions and effectiveness of this work were:

- the time spent catching the goats, one by one, before milking each animal.
- the milker's posture while doing the actual milking.

We found a large variation in the time spent to milk a goat (ranging from 30s to 1m 45s), who is understandable due to the different rates of milk produced from each animal, and variations in the ability of each milker.

Also, we found variation in the time spent to catch a goat (ranging from 12s to 1m 29s). In this instance, variations can be explained by the ability of the milker and the area in which the animals are enclosed.

In addition, the time of these tasks increases later in the labour process, which may be due to the milkers' tiredness.

Every period of one hour, we found that the milker is doing hand milking during 37 minutes (about 62% of the milking labour) and spending 23 minutes catching and securing the goats (about 38% of the milking labour). During this period, the milker milked about 39 goats. During hand milking, the milker remained in a crouched, hunched awkward posture.

On the farm that had installed the platform with a self-locking barrier, the results were different. During the same period (one hour) the milker hand milks for 39 minutes (about 65% of the milking labour) and spends 21 minutes (about 35% of the milking labour) to replace and feeding goats on the platform. In addition, in this same period, the worker milked about 48 goats. And in this case, the milker was able to do the job standing.

## **5 Conclusions**

The work we have already conducted allows us to conclude that, in this region, the demonstrations carried out on farms are a good way to promote the adoption of new techniques and technologies in order to improve milking and working conditions. Demonstrations and educational training tasks carried out on farms can reduce farmers' mistrust and lack of knowledge about the use of new equipment and technologies.

On the goat farms studied in this region, comparing traditional manual milking with manual milking using a platform and self-locking barrier, the results suggest an improvement in milking and working conditions, a less-stressful posture for milkers and increased work efficiency.

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