

A STRATEGY TO PREVENT DAMAGES IN PORTUGUESE SMALL RUMINANTS PRODUCTION DUE TO HOT CLIMATE CONDITIONS

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SUMMARY- In some Portuguese inland regions, small ruminants can be subject to hot climate conditions, as high temperatures or heat waves. These conditions can affect animal production, mainly milk and its quality. In fact, data from previous years, shows that temperatures in Summer tend to be high, and several heat waves have occurred, with temperatures above 40 °C. To minimize the effects of these adverse climatic situations on animal production, we are carrying out a work to tackle this problem.

Key-Words: small ruminants, hot climate, heat waves damages, prevention.

RESUME- Dans quelques régions intérieures du Portugal, les petits ruminants peuvent être sujets à des conditions climatiques chaudes, comme les températures élevées ou vagues de chaleur. Ces conditions peut affecter la production animale, principalement le lait et sa qualité. En fait, les données des années précédentes, prouvent que les températures en été tendent à être de plus en plus hautes, et plusieurs vagues de chaleur se sont produites, avec les températures au-dessus du 40 °C. Pour réduire au minimum les effets de ces situations climatiques défavorables sur la production animale, nous menons à bien des travaux pour aborder ce problème.

Mots-clés: Petits ruminants, chaleur extrême, vagues de chaleur, dommages, prévention.

INTRODUCTION

In some portuguese regions, sheep and goats have (and has had throughout time) a great socioeconomic value, particularly due to the fact that alternative economic activities are very scarce, in these regions. Under several difficulties and disadvantages due to local or regional conditions, small ruminants farms have to face another difficult situation that were becoming more and more frequent: periods of several consecutive days with very high temperatures, or even heat waves.

These hot climate conditions can affect small ruminants production, such as the other livestock production, and may bring about serious problems or damages to animals and losses to the farmer. It is important to minimize the effects of extended periods of very high temperatures and to prevent damages in small ruminants production.


SMALL RUMINANTS IN PORTUGAL

According to the Economic Accounts for Agriculture (INE, 2006), in Portugal, animal production represents about 41% of the Agricultural Income. Meat (67%) and milk (29,5%) are the major products from animal breeding.

Considering income values, small ruminants have less significance or value than cattle, swine and poultry. However, in some regions of Portugal (mainly inland) the breeding of small ruminants is quite relevant, not only because of meat and milk production, but also because these breeders are dealing with mountainous areas or regions where agriculture is the main activity and alternative economic activities are scarce. Table 1 shows Portuguese agrarian regions and respective number of sheep

and goats. Identically, Fig. 1 shows the geographical distribution of sheep and goats, according to administrative division.

Table 1. Small ruminants location in Portugal ($\times 10^3$) in 2005 (INE, 2005)

	Region	Sheep	Goats
	Entre Douro e Minho (A)	129,8	60,0
	Trás-os-Montes (B)	298,3	64,2
	Beira Litoral (C)	167,8	68,9
	Beira Interior (D)	418,3	97,2
	Ribatejo e Oeste (E)	229,4	47,3
	Alentejo (F)	1 225,8	78,4
	Algarve (G)	56,7	16,0

Sheep are more common in Alentejo and Center and North inland regions. Identically, goats can be found in Center inland, Alentejo and North regions.

In the national context these inland regions are considered less-favoured and depopulated areas.

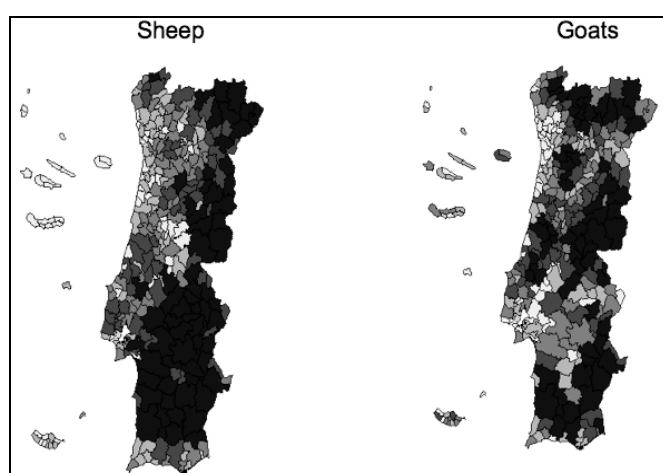


Fig. 1- Number of sheep and goats in Portugal (concelhos)

In these inland regions, sheep and goats are raised according extensive systems; and climate conditions are not harmful to the grazing system or animal production. However, in Summer, some periods with very high temperatures may occur. That can affect animal production, mainly milk production. According to recent data from previous years, temperatures in Summer tend to be high, and several heat waves have occurred, with temperatures above 40 °C.

HOT CLIMATE CONDITIONS IN PORTUGAL

Portugal is located in Southwestern Europe and it has a mediterranean climate. Summer is hot and dry particularly in Alentejo and northeastern regions. Significantly high temperatures combined with dry air (or even wet air) may bring about serious problems or damage to livestock and losses to the farmer.

In the map of Fig. 2, we can see the zones, and the corresponding number of days per year, with the maximum temperature over thirty degrees. In these regions, occasional high temperatures or heat waves (several consecutive days with very high temperatures) can occur. According to the HWDI (Heat Wave Duration Index) from 2000 to 2006, in Portugal, several heat waves have occurred, as we can see in Fig. 3.

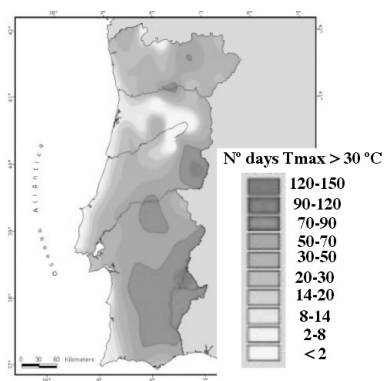


Fig. 2- Average nº days where $T_{max} \geq 30\text{ }^{\circ}\text{C}$ (1961-1990)

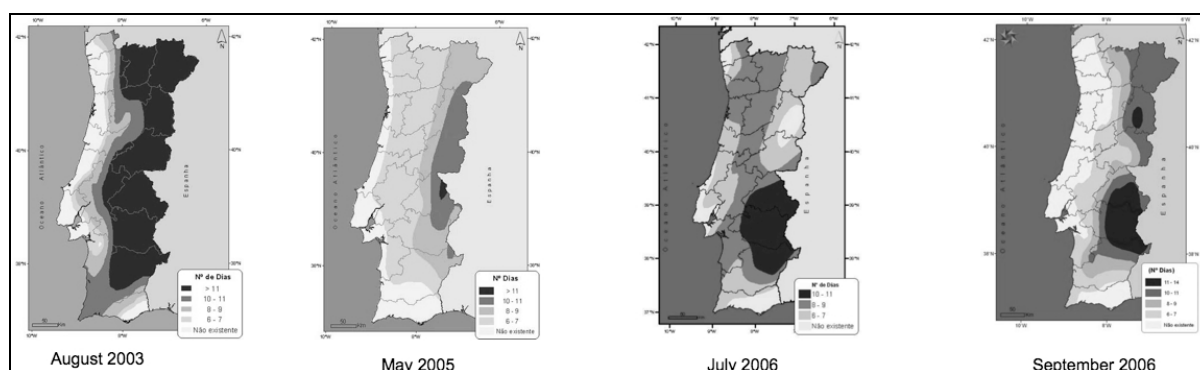


Fig. 3- Some heat waves occurred in Portugal, along 2003, 2005 and 2006

CONCLUSION

We can see, from these several maps, that regions with higher risk for high temperatures, or heat waves, have a large coincidence with the regions where sheep and goats are more common.

In fact, we can estimate that 77% of sheep and 54% of goats, in Portugal, are located in regions with a significant risk of heat waves, or occasional very high temperatures conditions. Significant high temperatures may cause serious problems to flock, or economical damage. Sheep and goats present some specific conditions, due to particular extensive farming systems. However, small ruminants production can, also, be affected by this problem, specially milk production and its quality.

It is important to develop a strategy to tackle this problem, and to prevent damages in small ruminants farms. Besides, in most cases, breeders are not prepared to handle animals under high temperatures; they lack facilities and/or knowledge about this problem.

To minimize the effects of these adverse climatic situations on small ruminants production in Portugal (as also in livestock, swine and poultry), we are already carrying out a work to tackle this problem. For that purpose, we intend to develop a set of strategies aiming at: collecting information and identifying the problem in all different Portuguese regions; evaluating the effects of the climatic factors on small ruminants production; studying the effects of high temperatures in milk production and quality; advising breeders about the risk of heat waves or, even, occasional high temperatures; studying strategies and methods to help breeders cope with the problem.

REFERENCES

- IM (2003) *Caracterização climática- 2003*. Instituto de Meteorologia IP, Lisboa.
- IM (2005) *Perfil climático-Portugal continental, clima 1961-1990*. Instituto de Meteorologia IP, Lisboa.
- IM (2006) *Informação climática- Verão 2006*. IM: Instituto de Meteorologia IP, Lisboa, Portugal.
- INE (2007) *Contas económicas da agricultura 2006*. Instituto Nacional de Estatística, Lisboa.
- INE (2005) *Inquérito à estrutura das explorações agrícolas*. Instituto Nacional de Estatística, Lisboa.