

Developing a set of strategies, in Portugal, to monitor and prevent damages in animal housing, due to hot climate conditions

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In Portugal, animal production (mainly meat and milk) represents 32% of the Agriculture Domestic Product and, in some regions, its socio-economic importance is quite relevant (PEN, 2007). Cattle are more common in Alentejo; in the littoral North; and in the Azores island. From these, dairy cattle can mainly be found in littoral North and the Azores island, whereas beef cattle is more common in Alentejo. Pigs are mainly raised in the littoral center of the country and in Alentejo, in the South. Sheep and goat raising is more common in Alentejo, and in the inland regions of the Center and North.

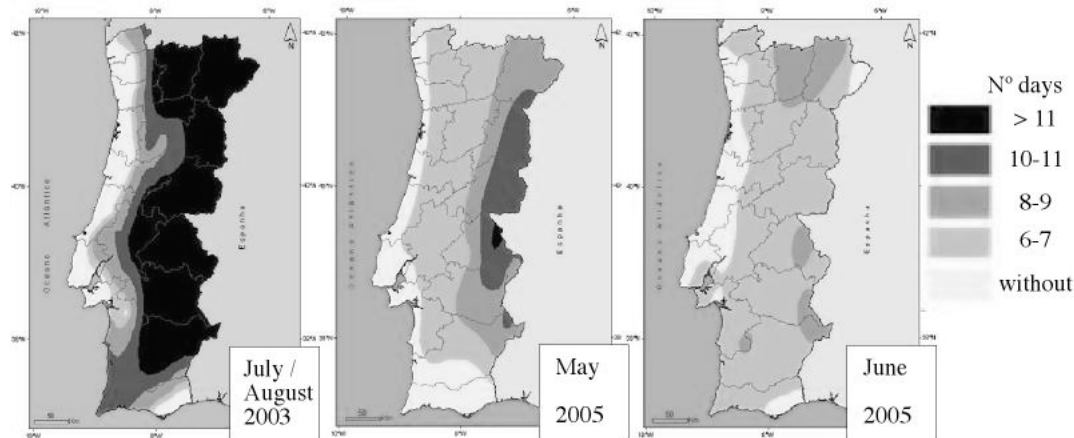
Table 1. Livestock location of animal domestic species in Portugal ($\times 10^3$) in 2005 (INE, 2005).

	Region	Cattle	Dairy			
			Cows	Swine	Sheep	Goats
A	Entre Douro e Minho (see A)	247,4	90,7	95,0	129,8	60,0
B	Trás-os-Montes (see B)	64,3	11,7	35,0	298,3	64,2
C	Beira Litoral (see C)	112,5	49,2	399,9	167,8	68,9
D	Beira Interior (see D)	46,8	9,9	45,0	418,3	97,2
E	Ribatejo e Oeste (see E)	139,8	21,3	802,4	229,4	47,3
F	Alentejo (see F)	474,7	17,2	354,0	1 225,8	78,4
G	Algarve (see G)	9,7	0,3	36,1	56,7	16,0
	Açores island	217,0	86,7	48,5	3,6	6,6
	Madeira island	3,3	0,3	17,9	3,2	5,2

Portugal is located in Southwestern Europe and it has a mediterranean climate. Winter is cold and wet. 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 Portugal, it is estimated that 20% of the annual losses in animal production are due to adverse climatic factors or deficient regulation in indoor climatization of animal housing. The situation is most problematic in summer when very high temperatures occur.

According to the HWDI (Heat Wave Duration Index) since 2000, in Portugal three heat waves have occurred; in August 2003 over a period of 17 days; in May 2005, during 11 days, with temperatures over 40 degrees C in some places; in June 2005, a heat wave that lasted for 12 days, with temperatures over 40 degrees C in several regions. Figure 1 shows the localization of the regions most affected by these heat waves. Generally, in all regions, these periods of very high temperatures are combined with dry air (low relative humidity).

Figure 1. Duration (days) of heat waves from July/August, 2003; May 2005; and June 2005.



In most cases, the buildings are not suitable for animal housing under high temperatures. They lack appropriate equipment to control indoor environmental conditions.

To minimize the effects of these adverse climatic situations on animal production, in Portugal, we intend to carry out a work project to tackle this problem. For that purpose, we intend to develop a set of strategies aiming at:

- collecting information about animal breeding in different regions and animal housing conditions or climatization of animal houses;
- identifying the climatic factors that affect livestock, in all portuguese regions, specially those related to hot climates;
- identifying the climatic diversity of the several regions and, above all, the factors that can affect animal housing;
- evaluating the effects of the climatic factors on animal production, in different regions;
- advising farmers about the risk of heat waves or, even, occasional high temperatures;
- studying strategies and methods to help farmers cope with the problem;
- creating a webpage, as a tool to spread information and advice to the farmers.

To carry out this work we have to organize a multidisciplinary team, in order to embrace all different fields of interest related to this problem.

We also intend to involve several entities, like breeder associations, producer organizations and public institutions.

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