

In this I refer to: Canine guides (and their superiors) of the Canine expert section of the Military Police, who have worked alongside us at every stage of this project, giving over their time and resources as and when we needed them.



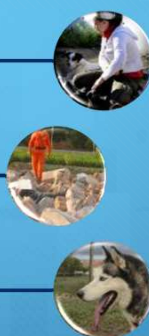
Head Vet Diego Lozano, in charge of the Military base's canine section, who encouraged us and contributed to the completion of this project,



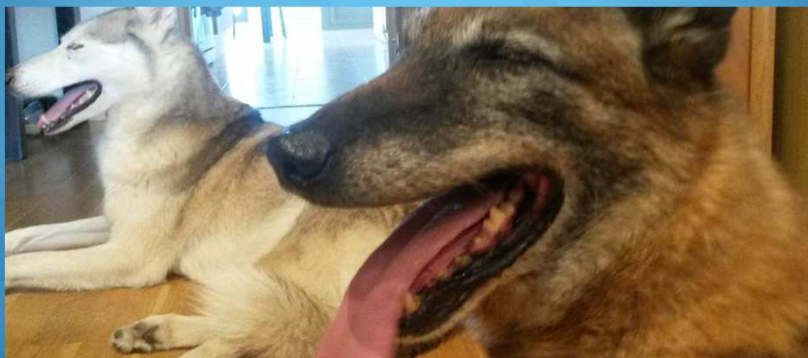
...and of course vets Dominique Granjean and Delphine Cléro who were not only those who had the original idea, but also those who came up with the development methods of this investigation.




And finally myself. I direct a small service of sporting and working dog medicine in the Department of Veterinary Medicine in the Universidad Cardenal Herrera, a private university in Valencia, Spain. To introduce myself more fully, I tell you that I am accompanied in life by 2 dogs – a 13 year old husky and a 14 year old Belgian shepherd. Both are hard working successful dogs, Larra in Mushing and Dutch in security and combat.



I', sharing this with you so that you understand that my heart is divided between two different activities, and I dedicate this project to them.



○ I insist in starting with this reference because I believe that in the world of working dogs, it's vital that we bring together knowledge, effort and strength. This is something that Vet Grandjean said many years ago, and I strongly believe that it is the path that we need to take if we want to continue evolving in the improvement of our sporting and working dogs.



- I will now move on to explain what our work consisted of, and how it began with one main goal – to better understand the humidity conditions, temperature, luminosity and carbon dioxide levels in the kennels of the Canine expert section, with the aim to recognise the thermic stress conditions that these dogs had to tolerate, and to monitor their wellbeing. This initial data interested us a lot, given that 2 of the dogs in the canine section had already suffered from heatstroke, and also in Valencia, while one might say that the climate is 'mild', the place where the dog kennels we located and where they had to work often gets extremely hot.

- For this reason, our first task was to determine the different temperatures in different parts of the kennel, including the water temperature, at ground level, on the roof, inside the kennel and on top of it, and we also measured the temperature in their training areas, be that in cars, sunny, exposed areas or inside a building.

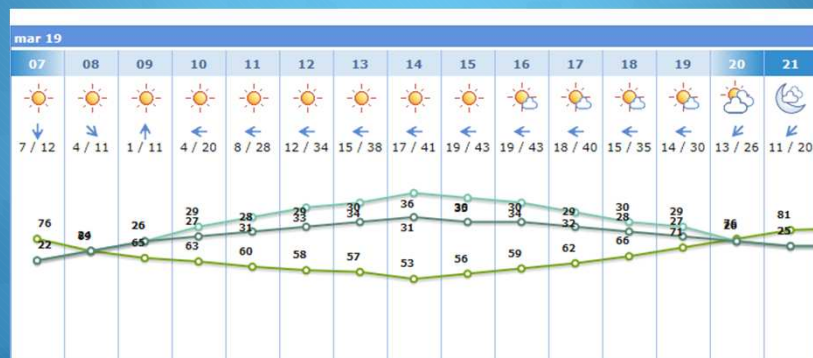




- It was a good starting point given that, thanks to this study, we were able to find out for example that the temperatures inside cars in which they were training in July could reach up to $58,7^{\circ}\text{C}$ and that the average temperature inside the kennels, notable on its roof where the dogs often sleep was more than 38°C , way above what is considered ideal for a dog, and that the temperature inside the kennel could reach $45,3^{\circ}\text{C}$

- In this preliminary study, we found out the temperature conditions that the dogs habitually were living in, and we concluded that it would be necessary to quantify several atmospheric variables, not only temperature but also humidity, wind speed and solar radiation.

In this sense, I think that it would be interesting in the future to evaluate how these atmospheric variables influence the temperature in these working zones.



- But we wanted to know something more about the ways different dogs adapt themselves to temperature. We wanted to take into account individual variables, such as the colour of their fur, the level of acclimatization, their level of hydration, the intensity of the work being carried out, and their sensitivity in accordance with their age, gender and state of health. This was our second main objective. And to jump ahead of myself, I can tell you that we were surprised by what we found.
- Let's begin the study...

Video!



Conclusions

1/ The authors believe that collaboration between canine sporting medicine and other investigation groups is fundamental. This working group was created for the preparation and realization of this investigation project and we are looking to expand it by integrating sporting medicine specialists into the team to deepen and improve our study together, using vets specialised in sports and service dogs.

Conclusions

2/ As vets, we accompanied the canine guides in the care of the military dogs, and given our interest in canine sporting medicine, we tried to improve their efficiency, avoiding risks to the dogs health which could lead to disasters, such as heatstroke which is considered by authors as a biological cataclysm which can cause distress to the dog at all levels and ultimately result in its death.



Conclusions

3/ The collaboration of the canine guides for early detection and recognition of the living conditions of the dogs in situations of thermic stress is a vital tool to be able to achieve the best and most efficient result when it comes to the wellbeing of the dog.

Conclusions



4/ The methods of controlling thermic stress must be individually tailored, because within the same section the conditions of luminosity and temperature can be very different, depending on the location and layout of the kennels. Also linked to these are individual variables such as the level of acclimatization, the level of hydration, sensitivity to heat (which will depend on the dog's age, state of health, body surface area, obesity and gender), meaning that thermic stress should be studied taking each individual dog into account.



Conclusions

5/ The realization of complete physical examinations and physiological mapping in each section was a big help when it came to understanding the individual variations and the different dogs' responses to high temperatures. These physical examinations complemented effort and exertion tests, or outdoor tests, according to the availability of each team and the willingness of the vet in charge. With this we have a deeper knowledge of the response to high temperatures, which is not only thermic but also cardiovascular and motor.



Conclusions

6/ Trying to avoid heatstroke is one of our main goals, especially in Betera, Valencia, which despite having a so called 'mild' climate, can reach temperatures of up to 44°C in summer (111,20°F).



Conclusions

7/ In the future we should ask ourselves whether dogs which are more adaptable to high temperatures should be incorporated into the military canine section, including genetically selected dogs, because it is possible to intervene with the genomes to create canine teams which are physically adapted to warm climates.



Conclusions

8/ It is necessary to create a register of military dogs who have suffered heatstroke to include a complete identification, including a copy of pedigree, it's habitual environment, the circumstances in which brought on the heatstroke, the exterior temperature, the work or training that the dog was undertaking prior to the heatstroke, the relative humidity and the analytical results from the vet (including blood coagulation times).

Conclusions



9/ One of the dogs, a 20 month old male had already suffered from heatstroke and we put this down to his fur (he was a black German Shepherd), demonstrating that he was particularly sensitive to heat. During the first test he had a rectal temperature of 43°C. This rang alarm bells for us, because his blood pressure was also elevated. We diagnosed him with systemic lupus erythematosus, which we have now stabilized. For this reason, these tests were able to detect other underlying health problems.

Conclusions



10/ Training, or the learning phase, the control of stress and the use of optimum cooling equipment are fundamental tools to achieve the best and most efficient adaptation to high temperatures, especially in dogs who are particularly sensitive to heat. In our next study, we will standardise the humidity and temperature conditions to do an effort test on a treadmill, and we will test different cooling jackets which currently exist.

