This simmering heat

Recent weeks have seen some of the hottest temperatures in living memory for the UK. Temperatures so barbarically hot that many of us haven't encountered them short of a holiday somewhere only two junctions shy of the surface of the sun, or maybe just the equator, says **Alex Wade**

Suffice to say the increase in heat has come with some of its own challenges, not just for us working in it, but for the pest animals simply just trying to survive it.

The need for heat is a biological imperative. Chemical reactions under normal circumstances require an abundance of two things, heat and a lot of random chance. In nature this means that the chemistry we usually take for granted inside our bodies when replicated outside of a cell takes a long time, sometimes even measured on the scales of eons.

However, it is abundantly apparent that most biological entities do not have eons to wait for some of these simple chemical processes to unfold and to overcome this rather unseemly lack of patience all living organisms have developed a little bit of a work around, in the form of enzymes.

Enzymes are made from one or more proteins that in turn are made from amino acids, which I am also obligated to now inform you after long tradition are what we must refer to as the 'building blocks of life'. But enzymes, although seemingly magic in their abilities, have a very specific range of conditions within which they can function.

If temperatures drop too low, for example, they will slow down and not be able to work rapidly enough to facilitate normal biological functions, which is generally considered to be a 'bad thing'.

> *"The need for heat is a biological imperative"*

Conversely, as temperatures rise they will reach an optimal range within which they will function at peak efficacy. Yet not far beyond that, however, these tiny powerhouses will start to break down and return to their original constituent parts, ceasing to have any functional effect.

This breakdown is precisely the same effect you witness when you cook an egg and the albumen turns from a translucent goo to a thick, white rubber. The same process can occur within our own cells and when it happens within a still living animal it has similarly drastic effects.

Temperature can be a tricky balance to master, with too little forcing enzymes to cool down and become less effective, and too much seeing enzymes heat up, denature and cease to function ever again.

Nature has had quite some time to work at this balance and has adapted to these constrictions in a number of ways. Some animals, such as insects, rely on their environment to provide the necessary temperatures to bring their enzymes to peak efficacy, while others such as rats and mice take responsibility for the regulation of their own body temperatures instead.

In the case of insects, the relinquishing of the responsibility for generating a stable body temperature has proven to be a highly energy effective strategy, as it requires little biological effort on behalf of the insect to function (other than to ensure that they position themselves in the right place for the right length of time).

These animals are known as poikilotherms and, although it might seem like a tremendous risk to leave the efficacy of one's own cells to the whim of the sometimes rather capricious weather systems, there are some distinct advantages to it. Firstly, poikilotherms don't need nearly so much energy to survive, having let the environment and its ambient temperature do much of the heavy lifting for them. This makes them exceedingly efficient and reduces their need for food and resources significantly when compared to, say, a mammal of comparable size.

This temperature relationship can be seen with many pest insects such as bed bugs, whose

In hot weather, rats and mice will nest in burrows