

Cold-blooded

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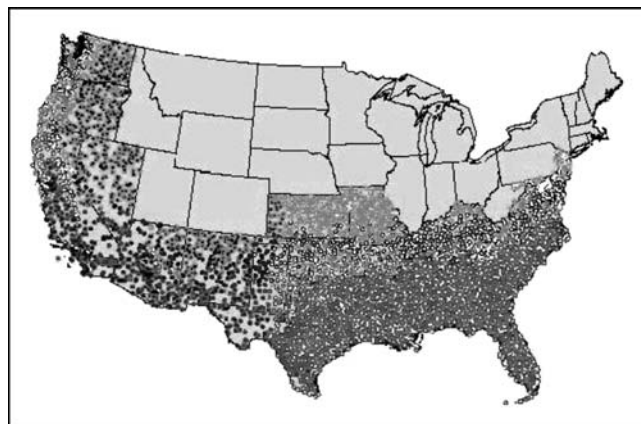
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Cold-blooded is a particularly apt term for insects and especially for Hymenoptera. By definition, insects are poikilothermic, as they have no control over their body temperature and are at the mercy of whatever temperature the environment supplies. Consequently, it is wise to exterminate wasp, yellow jacket, and hornet nests early in the morning or late in the evening. These insects return to their nests with a drop in temperature and their movements and reactions are slower. The exterminator will be able to affect more individual insects and decrease their chances of being stung.

Poikilothermia also explains the reason why imported fire ants (*Solenopsis invicta*) are considered to have a northern limit of spread into the United States. This species (native to South America) arrived in North America in the early 20th century and have spread quite rapidly, but because of intolerance of cold, its northern limit of expansion was suspected to be near the -12.2°C isotherm [1] (Fig. 1). Although these insects sometime provide surprises such as wintering under interstate roads, which are kept free of snow and absorb whatever solar radiation is available, and then appearing in spring beside the interstate roads north of where they should be, they are currently close to their northern limit of expansion.

Figure 1 United States Department of Agriculture: map of current (as of 2000) imported fire ant range in the United States



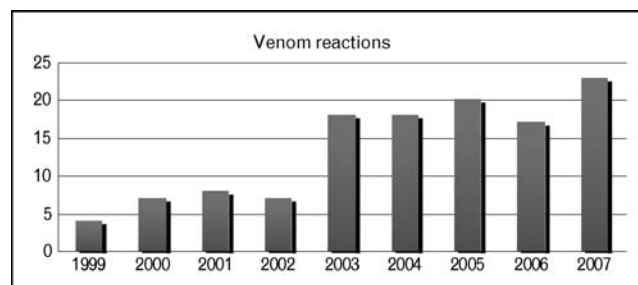
Global warming may increase imported fire ant range well into the northern shaded areas.

We have all heard of the recent concern about global warming. Scientists are predicting an increase of between 1.4 and 5.8°C by the end of this century, and assessments and predictions of what this means for humanity abound [2,3]. Rising temperatures will melt glaciers and ice caps, change sea levels, pH and salinity of our oceans, and affect sea life and fishing [3,4]. Global warming will affect weather patterns with potential for increases in catastrophic severe weather as well as changes in rainfall that will change where food can be grown [3,5]. It will also affect insect born diseases such as malaria and dengue [2,5]. Overall, the World Health Organization estimates that climate changes from Global Warming in the past 30 years are already responsible for an excess of over 150 000 deaths per year worldwide [2].

As global warming occurs, there will be effects on non-vector insects such as Hymenoptera. For example, a temperature increase will push the -12.2°C isotherm much further north, significantly increasing the potential range of the imported fire ant. I wrote to some of our allergy-immunology colleagues in northern climes to ask if they have seen any increase in hymenoptera reactions. Dr Gunilla Hedlin replied from Sweden that she has not seen an increase in Hymenoptera reactions but has seen an increase in vector born diseases such as borrelia. Dr Jeffery Demain (personal communication), who sparked my interest in this topic and has had a long interest in it, replied from Alaska, with Fig. 2. This figure clearly demonstrates an increase in Hymenoptera reaction evaluations in his clinic in recent years.

There is another meaning for cold-blooded, which is just as apt for Hymenoptera as the fact that they are poikilothermic. This has to do with emotionless acts especially killing. Every year people with hypersensitivity to insect venoms die as a result of Hymenoptera stings.

Figure 2 Allergy Asthma and Immunology Center of Alaska



Courtesy of Dr Jeffery Demain.

Instructions given to these patients include a discussion of avoidance. This may include moving further north to get away from the insects. Yet with global warming, the places one can go to be safe seems to be decreasing. Deaths from yellow jacket stings have been reported now even in Alaska [6].

Therefore, it seems quite clear that global warming should be of particular importance to those of us interested in the medical effects of Hymenoptera. I have often considered global warming to be a topic that I did not need to become emotionally involved with as the effects seemed distant from me. Now, in considering the implications for medical effects from Hymenoptera, a topic of considerable importance to me, I find it is time

for me to take a real interest in global warming and stop being so cold-blooded.

References

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