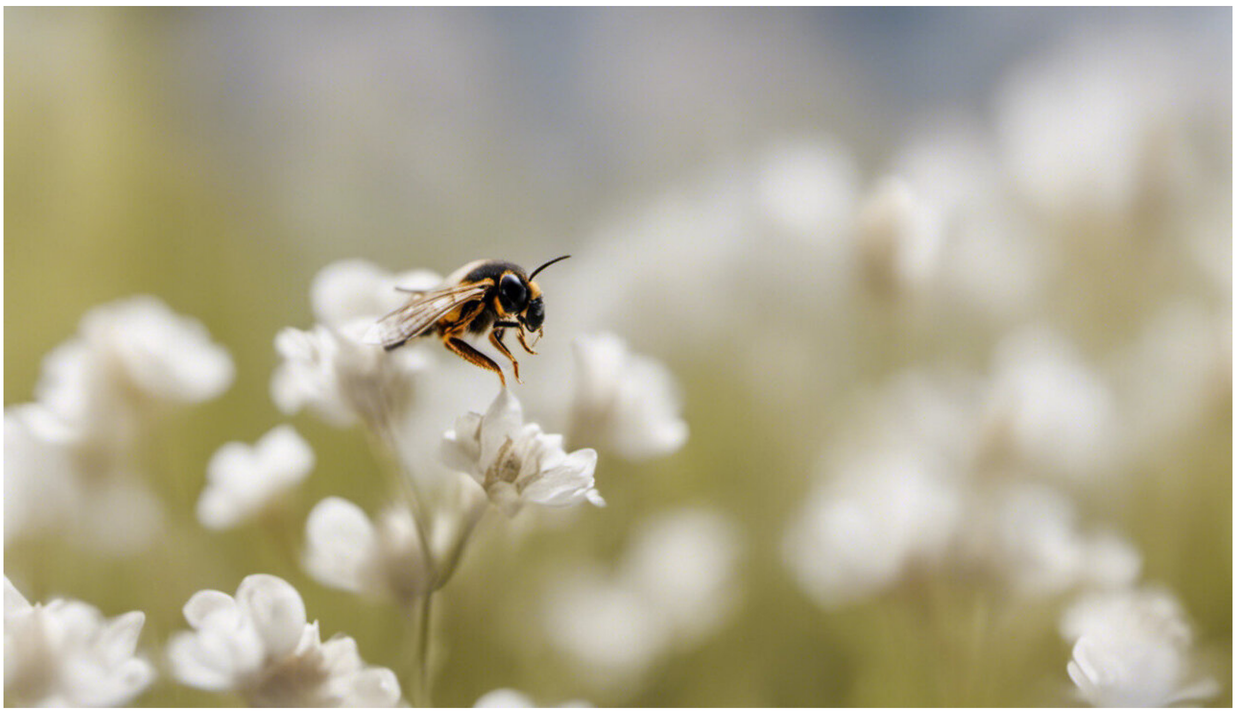
We faced abuse for asking people to kill wasps for science – here's why it was worthwhile

September 28 2017, by Adam Hart



Credit: AI-generated image (disclaimer)

When we launched a citizen science project earlier this year, we didn't expect to get in so much trouble.

We wanted to public to help us find out more about social wasps (the black-and-yellow striped insects that bother us at picnics and BBQs) and so we launched the Big Wasp Survey. Social wasps are essential pest-controllers and pollinators, but some species are declining while others are expanding their populations and range. Without basic data on the abundance and distribution of these wasps, we can't conserve (or control) them.

Yet we know relatively little about social wasps in Britain. So we asked the public to set out beer-filled traps for a short period of time when mostly old and soon-to-die worker wasps would be active. This approach would provide essential data that we need to manage social wasp populations. But beer traps kill wasps, and that seemed to upset a lot of people.

Asking the public to kill wasps in the name of science led to high–profile national media condemnation. But our negative experiences were relatively mild – some scientists studying invertebrates have been subjected to torrents of social media abuse for "killing in the name of science".

Credit: AI-generated image (disclaimer)

It seems our study played into an old stereotype of an entomologist as a Victorian-style net-wielding naturalist, capturing and killing six-legged victims that are then pinned and banished to dusty drawers. More a lethal stamp-collector than a scientist.

The reality is modern entomologists are involved in science that underpins pressing societal and environmental issues including medicine, genetics, ecology and climate change. Unfortunately, this research still relies on killing insects, a practice accepted as a necessary evil by scientists but easily criticised by others, as we found.

There are three main reasons why entomologists sometimes have to kill what they study. First, many insects can only be identified by microscopic examination, for example by the shape of their genitalia. A photograph simply isn't enough for this. We need a dead specimen.

Second, we often need a lethal approach to catching insects, using techniques such as pan traps (open pans of water) or pitfall traps (sunken traps filled with fluid to kill and preserve insects that fall in). Otherwise it's much too difficult to catch them.

Credit: AI-generated image (disclaimer)

Finally, scientists have learnt a great deal about some important and fundamental aspects of biology and medicine by killing insects. Data on the effects of agriculture, habitat change, the effects of pollution, predator-prey dynamics, and the ecological effects of climate change come directly from studies that leave dead insects in their wake.

The field of genetics would also be nowhere without the fruit fly, which have died in their billions to provide DNA samples in our quest to unravel the fundamental mechanisms of life. Likewise, the American cockroach, the Indian cricket and the mosquito have all died to develop our understanding of nervous systems, ageing, development and disease.

In the case of the Big Wasp Survey, relying on untrained citizen scientists to observe wasps without killing them wasn't an option. We needed a standard method that everyone could follow and it isn't possible to reliably observe and count individuals without trapping them. Although there are only eight common species of social wasp in the UK, it's surprisingly difficult to identify them from living specimens. Without proper wasp identification, our study would be scientifically obsolete.

If we can collect a colony's worth of wasps we can generate fundamental science to help manage and conserve these important insects. But, again, this would be completely impossible without the actual (dead) specimens for us to accurately identify and use to find out which species are where. We also couldn't develop any additional research, such as looking at how wasp colour varies in different places, which might reflect pollution levels.

Reduce, refine, replace

Biological research on vertebrate animals (such as fish, mammals and birds) is underpinned by the environmental principle of the Three Rs (reduce, refine, replace). Insect scientists also adopt this principle where they can.

For example, you can use statistical maths to work out the minimum number of individuals (or samples) required to test a particular theory. Improved photography can let us identify some insects such as butterflies without killing them. We can even now use non-lethal methods to take minute quantities of DNA from some insects, allowing us to identify them without killing them.

Every day, billions of insects die splattered on vehicles, poisoned by insecticides or casually swatted for no scientific benefit. In contrast, the tiny number killed by entomologists help us to understand, among many other things, genetics, disease and ecology. The Big Wasp Survey has already collected data from several thousand locations across the UK, engaged millions of people with the value of social wasps and sparked off a number of potential new scientific collaborations with ecologists across Europe.

Entomologists have long been troubled by the need to kill insects, and are seeking ways to reduce, refine and replace fatal sampling and identification methods. In the meantime, and in the face of censure and condemnation from those that do not understand the science, entomologists will have to continue to kill insects to make meaningful scientific advances. There are few in the field that do not look forward to the time when this is not the case.

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