

TECH-2-TECH

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This section offers readers the opportunity to submit informal contributions about any aspects of Animal Technology. Comments, observations, descriptions of new or refined techniques, new products or equipment, old products or equipment adapted to new use, any subject that may be useful to technicians in other institutions. Submissions can be presented as technical notes and do not need to be structured and can be as short or as long as is necessary. Accompanying illustrations and/or photos should be high resolution.

NB. Descriptions of new products or equipment submitted by manufacturers are welcome but should be a factual account of the product. However, the Editorial Board gives no warranty as to the accuracy or fitness for purpose of the product.

Caring for insects

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Introduction

As a research technician at the Liverpool School of Tropical Medicine (LSTM), I have had ten years' experience of rearing multiple mosquito colonies and over a year of rearing a tsetse fly colony.

Throughout my career, I have attended various talks about the counselling and support options available to technicians working with the school's experimental mice but I have never seen any of this available to those that rear insects.

This has led to me thinking about how radically different our attitudes are towards mammals, birds, fish and amphibians used in scientific research compared to insects. I have reflected on this drawing on my years of experience and have asked the question, why this is the case? Increasing the use of insects in research demonstrates the complexity of cognition and potential for feeling pain.

Animal testing in the United Kingdom (UK) is tightly regulated and rightly so. I am sure many people are familiar with the guidelines enshrined in law of the Animals (Scientific Procedures) Act 1986 (ASPA), a summation from the UK Research and Innovation website.

- Animals protected by the law include all living vertebrates, including those most commonly used in scientific procedures, such as mice, rats and other rodents, and fish. Other species used include amphibians, reptiles and birds. Horses, cats, dogs and non-human primates are specially protected species under ASPA.

Invertebrate animals such as the fruit fly, *Drosophila*, and worms, which are also commonly used in biomedical research are not protected by the law.¹

Why are invertebrate animals not included under these protections? New legislation in parts of the world offers protection to cephalopods, given recent research

demonstrating their intelligence. But insects are still firmly kept off this list. Generally, it is assumed that their nervous systems are too undeveloped and their lifespans too short for them to feel pain.

However recent research has demonstrated that some species of insects, in particular ants and bees, are capable of much more complex acts of cognition than we realised and further research suggesting that insects might indeed feel pain.² This clearly raises ethical implications for the use of insects in scientific testing. It is not my intention to indicate that using insects for testing is wrong, indeed it would be hypocritical of me to say so given my role. However, I do want to open a space of discomfort, a provocation for myself as much as all the rest of us involved in scientific research and animal rights, to ask, why are we so quick to exclude insects from protections offered to other animals? What are my responsibilities of care and respect towards these creatures that I work with? If insects do feel pain, do we need to rethink our entire conception of them?

Debate

Insects are fascinating creatures and we have learned an incredible amount from them over their long history of use in scientific research.³ The fruit fly *Drosophila melanogaster* is a model organism. It has a short lifespan and an easily manipulated genome which has been used to learn a great many things about human and animal physiology, from embryonic development to disease mechanisms. Insects produce numerous and varied bioactive compounds which have given us antibiotics as well as treatments for cancer and neurological disorders. Insects that decompose bodies are used in forensic examinations to determine time of death and help to solve crimes. Many conservation programmes for insects involve the trapping and dissecting of many specimens of a species to identify and monitor the population.

The insects which I look after are mosquitoes and tsetse flies fall into this last category. We study these to help prevent vector borne diseases such as malaria, Dengue fever, Zika and sleeping sickness. These horrible diseases affect many of the world's poorest populations. The 2021 World Malaria Report⁴ showed that during 2020, that annual malaria related deaths increased to six hundred and twenty-seven thousand which was the highest level in nearly a decade due to disruptions caused by the COVID-19 pandemic. My role supports the important work that LSTM performs in finding ways to combat these diseases. Remember there is a very real toll in human death and suffering caused by these diseases before we discuss ethical considerations. Most of our work is related to finding effective ways to kill the insect vectors to prevent the transmission of diseases.

This creates a complicated relationship for me and my fellow insectary technicians with the insects we rear. I believe that everyone who spends time nurturing and caring for another living thing, whatever it may be, develops a sense of care and responsibility towards this living thing. However, most of our work revolves around testing the efficacy of different insecticides designed to kill the insects we have reared or infecting them with experimental viral or plasmodium infections to study the dynamics of the disease in the insect vector.

To do this, it is necessary to maintain the colonies at a level of husbandry where they are happy, healthy and thriving. Mosquito and tsetse fly colonies are very sensitive and must be carefully nurtured. All the colonies must be kept at specific conditions, regularly cleaned, not too overcrowded, fed and watered the correct amount at the correct time. Much time, effort and care go into rearing these creatures, many of which are killed during experiments. This contradiction is where my fellow insectary technicians and I live. We keep these creatures alive to find better ways of killing them. I feel it is worth consciously embracing this contradiction and one of the ways I try to do this is by keeping myself aware of my tsetse flies as animals with a right to exist on their own terms and as vectors of a deadly disease. By my own personal strange rituals, I say thank you and goodbye to each cage of flies I dispose of. I am not under any delusions that this means anything to the flies themselves but it allows me to think of them as creatures worthy of respect while I am working with them.

Conclusion

Like others that work within scientific research that uses animals, I had to find ways to make peace with the work that I do and it is always an ongoing process, especially with new research creating new information and new questions. I freely admit that I have more questions than answers but by keeping those questions alive and embracing the discomfort that comes from them is important. In 'Minds Without Spines: Evolutionarily Inclusive Animal Ethics'⁵, Irena Mikhalevich and Russell Powell call out our inherent biases in privileging vertebrate welfare over invertebrate welfare and call for more moral consistency in dealing with arthropods in particular. Regardless of whether they feel pain or qualify as sentient, insects are still living beings worthy of our respect. Our research is important and necessary in alleviating human suffering and I am not by any means denigrating insect testing. But these contradictions are worth holding in our minds and as an insectary technician I aim to approach the flies I work on with both respect and care, as living beings worthy of such.

References

- ¹ UK Research and Innovation (2023). 'Regulation and Policy' <https://www.ukri.org/who-we-are/mrc/our-policies-and-standards/research/research-involving-animals/regulation-and-policy> Accessed 27 November 2023.
- ² **Crump, A., Gibbons, M., Barrett, M., Birch, J., Chittka, L.** (2023). Is it time for insect researchers to consider their subjects' welfare? PLoS Biol 21(6): e3002138. <https://doi.org/10.1371/journal.pbio.3002138>
- ³ Royal Entomological Society (2023). 'What Have Insects Done for Us?' <https://www.royensoc.co.uk/what-have-insects-done-for-us> Accessed 27 November 2023.
- ⁴ Malaria No More UK (2023). 'New Figures Show a Dramatic Rise in Malaria Deaths' <https://malaria-nomore.org.uk/who-world-malaria-report-2021> Accessed 27 November 2023
- ⁵ **Mikhalevich, I., & Powell, R.** (2020). Minds without spines: Evolutionarily inclusive animal ethics. 29. DOI: 10.51291/2377-7478.1527.