

## Ecological Outline Rep. Kevin Castaneda

### Problem

There are many different types of species carrying infectious pathogens that can threaten the public health. Such diseases include malaria, dengue, and other mosquito-borne diseases.

### Proposed Solution

Use those species that can transmit infectious diseases as a way to eradicate the population that is carrying harmful pathogens. This is done in a study that controls a population using vector control. The disease vector is transformed into a more beneficial way for the public health. The eggs of the mosquitos are targeted in order to alter their abilities. The tetracycline-repressible expression system is used as a chemical switch to only enable the insect to survive until adulthood. The survival rate showed a 3-4% chance to survive but there was a 15% increase when cast food was used among the heterozygous.

### Regulatory Issues

A mass production of the sterile mosquitos is needed in order for this to work, which is difficult to even gather a bunch of pathogen transmitters. Studies also showed that there is a better chance of survival only with males. This is also a very time-consuming process and is still being constantly objectified.

### Proposed Regulation

Continue finding better ways to gather and alter the genes in a mosquito in order for a better survival rate.

### References

1. Holmberg T, Schwennesen N, Webster A. Bio-objects and the bio-objectification process. *Croat Med J.* 2011;52:740–2. doi: 10.3325/cmj.2011.52.740.
2. Metzler I, Webster A. Bio-objects and their boundaries: governing matters at the intersection of society, politics, and science. *Croat Med J.* 2011;52:648. doi: 10.3325/cmj.2011.52.648.
3. Beisel U, Boëte C. The Flying Public Health Tool: genetically modified mosquitoes and malaria control. *Sci Cult.* 2013;22
4. Webster A. Introduction: Bio-objects: exploring the boundaries of life. In: Vermeulen N, Tamminen S, Webster A, editors. *Bio-objects: life in the 21st century.* Farnham and Burlington: Ashgate Publishing; 2012. p. 1-12.
5. Hansen J, Metzler I. Governing bio-objects: a research agenda. *Croat Med J.* 2012;53:80–2. doi: 10.3325/cmj.2012.53.80.

6. Alphey L. Re-engineering the sterile insect technique. *Insect Biochem Mol Biol.* 2002;32:1243–7. doi: 10.1016/S0965-1748(02)00087-5
7. Wilke ABB, Marrelli MT. Genetic Control of Mosquitoes: population suppression strategies. *Rev Inst Med Trop Sao Paulo.* 2012;54:287–92. doi: 10.1590/S0036-46652012000500009.
8. Phuc HK, Andreasen MH, Burton RS, Vass C, Epton MJ, Pape G, et al. Late-acting dominant lethal genetic systems and mosquito control. *BMC Biol.* 2007;5:11. doi: 10.1186/1741-7007-5-11.
9. Nimmo D, Gray P, Labbé G. Eliminating tetracycline contamination. Oxitec Limited Confidential Information. p. 4. Available from: <http://libcloud.s3.amazonaws.com/93/de/e/986/MosquitoDocOriginal.pdf> Accessed: December 23, 2012.
10. Oxitec Ltd. A letter to Oxitec from Paul Reiter [Internet]. News and Views. Available from: <http://www.oxitec.com/a-letter-to-oxitec-from-paul-reiter-mphil-dphil-fres/> Accessed: December 23, 2012.
11. Favia G. (2015). Engineered mosquitoes to fight mosquito borne diseases: not a merely technical issue. *Bioengineered*, 6(1), 5–7. doi:10.4161/21655979.2014.988556