



Vector competence of British mosquitoes for arboviruses of equines and humans

Chapman GE¹, Archer DC¹ and Baylis M^{1,2}

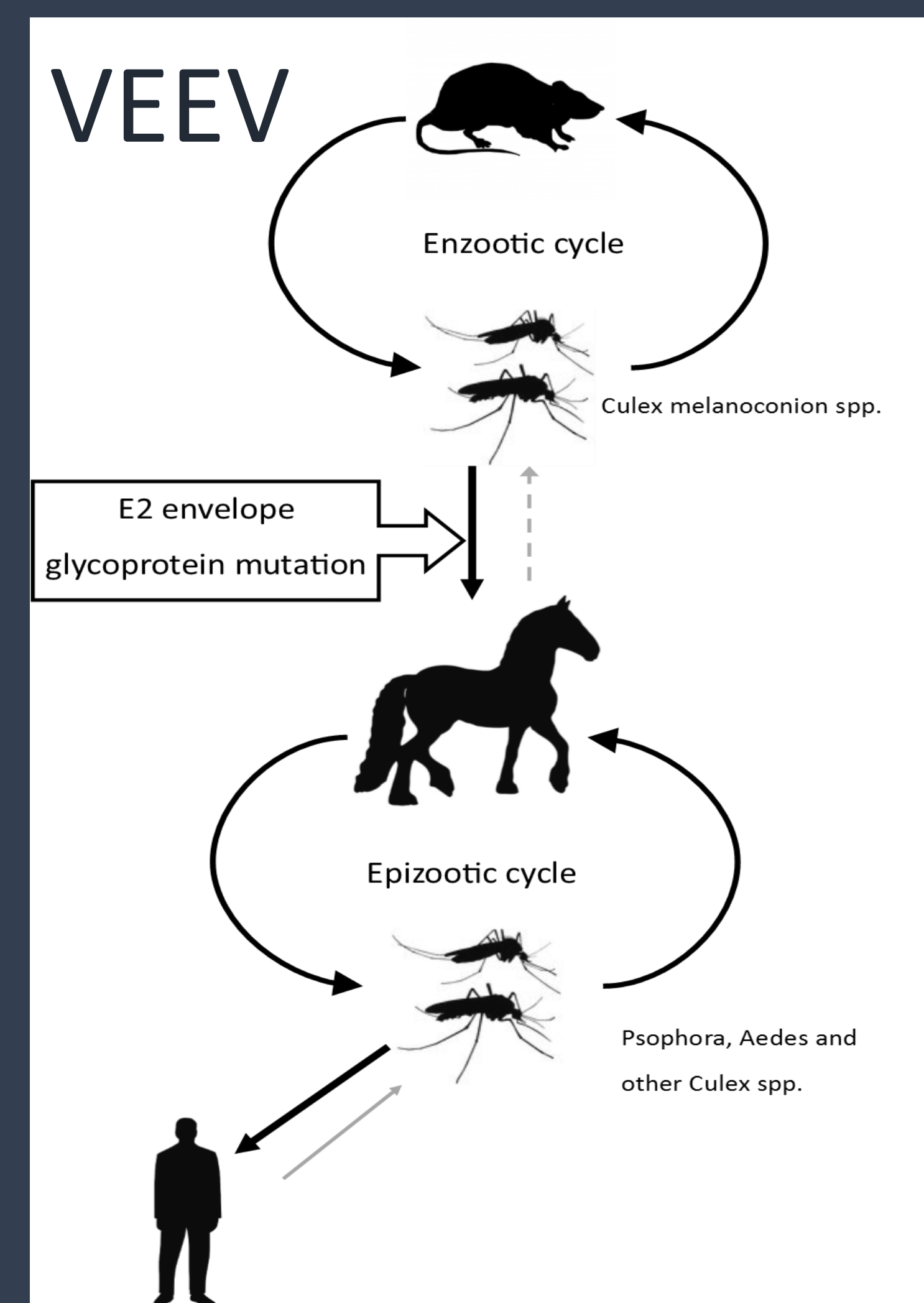
1. Department of Epidemiology and Population Health, Institute of Global Health. 2. Health Protection Research Unit in Emerging and Zoonotic Infections, University of Liverpool.
Correspondence to g.e.chapman@liverpool.ac.uk

We don't have any of these arboviruses or do we?

Transmission of arboviruses affecting horses and humans has not occurred in the UK, but increasing arbovirus emergence in Europe, climate change, and globalization are factors which point to the possibility of future UK outbreaks.

So how do we assess future risk?

With difficulty due to the complex nature of arbovirus **transmission cycles**. But we are investigating the ability of British (temperate region) mosquitoes to transmit viruses at different temperatures.



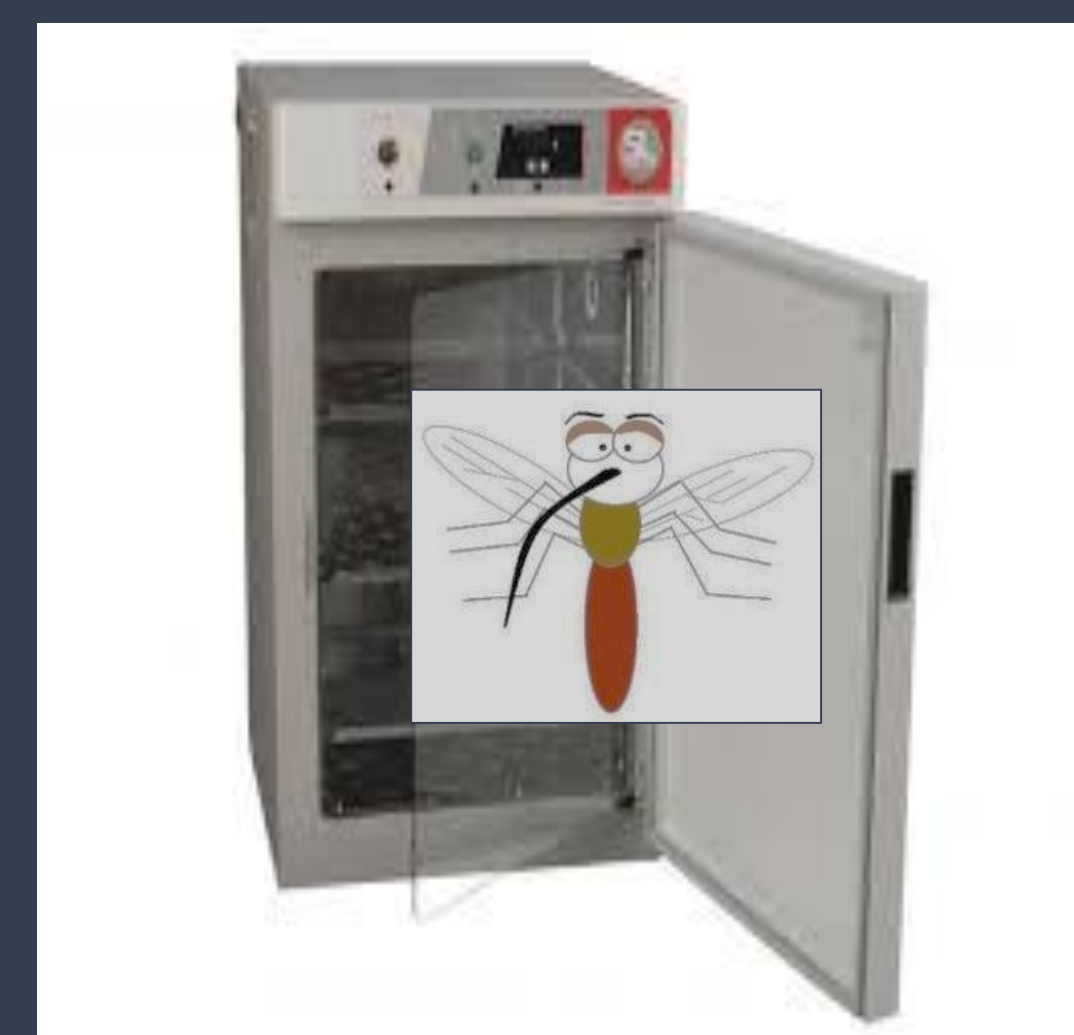
Methods



Hemotek – heats blood



Mosquitoes feed on blood and virus mixture (titre 1×10^6)



Incubate at 18-24°C for 7-28 days

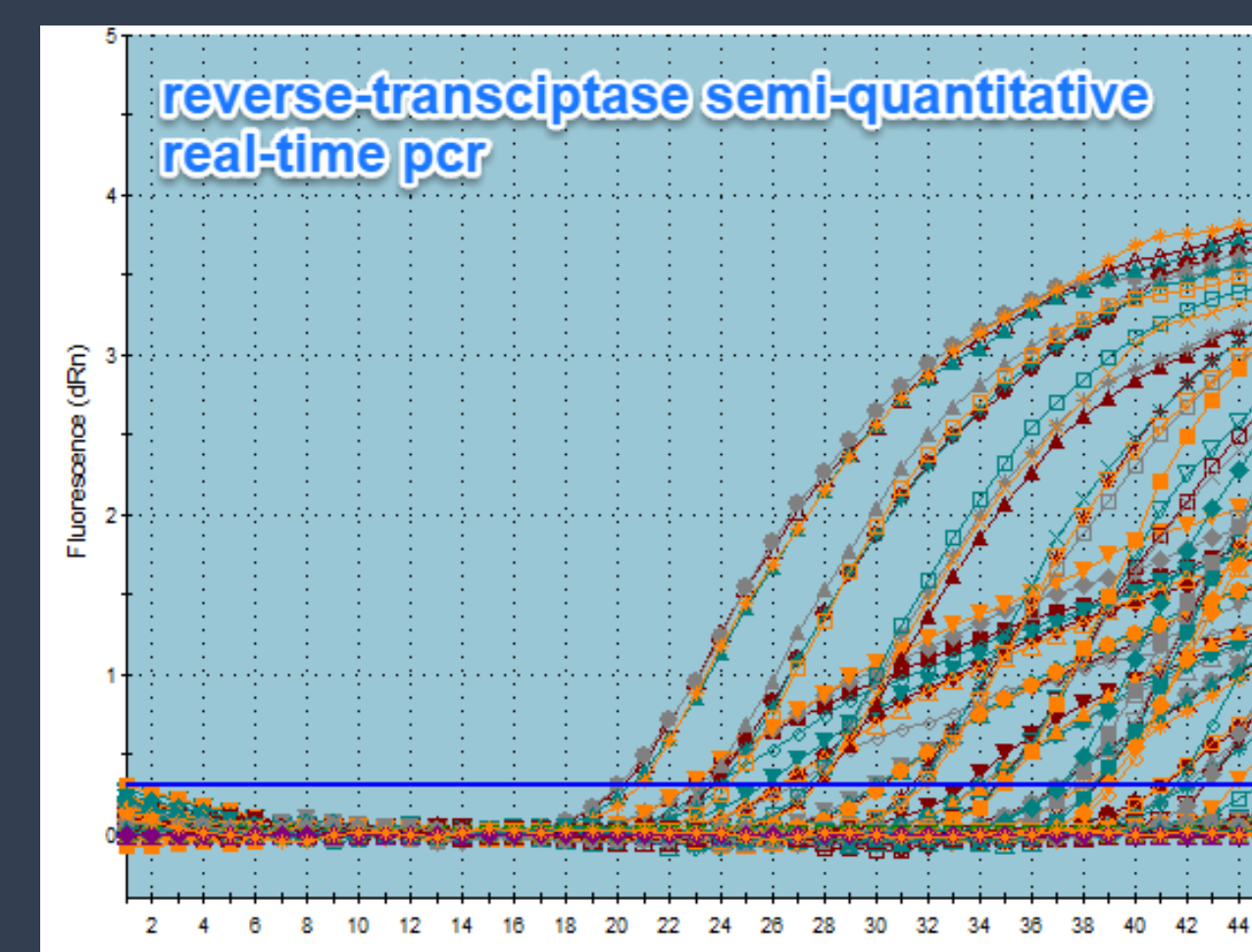
Results

Viruses	Mosquitoes	Maximum transmission
Venezuelan equine encephalitis virus	<i>Ochlerotatus detritus</i>	32%
	<i>Culiseta annulata</i>	16%
Ross River virus	<i>Ochlerotatus detritus</i>	37%
Japanese encephalitis virus	<i>Culiseta annulata</i>	37%
	<i>Culex pipiens pipiens</i>	72%
	<i>Ochlerotatus punctor</i>	67%

These transmission percentages are based on the number of mosquitoes with detectable virus RNA in saliva out of the total number infected, and tested at that time-point.



Extract saliva, RNA extraction, cDNA generation



What does it mean?

British mosquitoes are capable of transmitting these arboviruses at variable efficiencies, at temperatures as low as 18°C (warm summer temperatures in the South of England).

What next?

European mosquitoes e.g. *Cx. pipiens pipiens* should be investigated for extrinsic incubation period of JEV at temperatures found in temperate regions. Potential for overwintering in hibernating *Cx. pipiens* and *Cs. annulata* should be investigated.

Modelling