

THESIS TOPICS

Ecology and Evolution of Infectious Diseases

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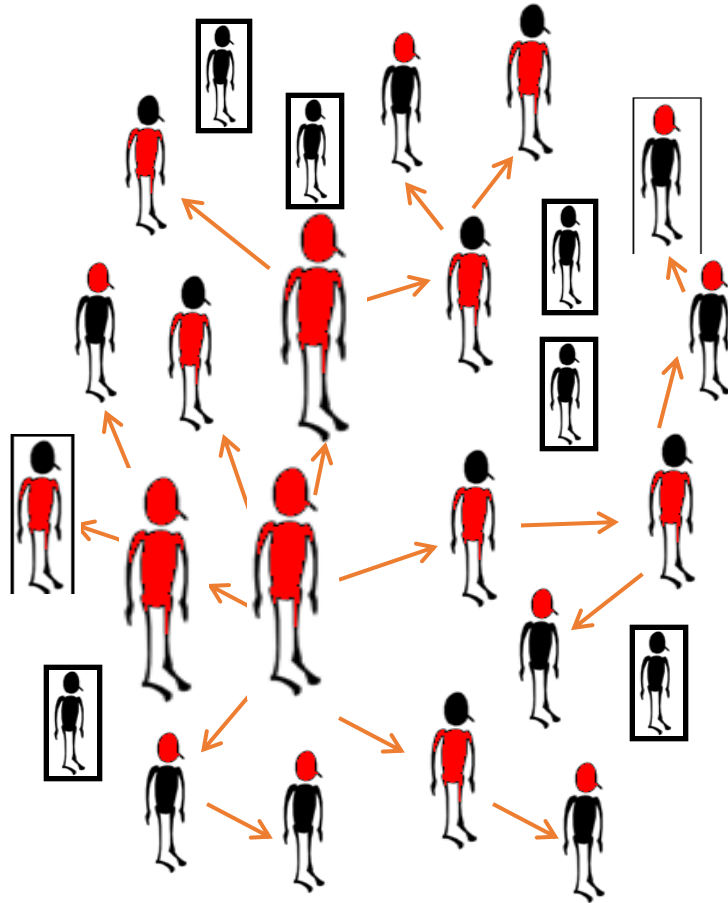
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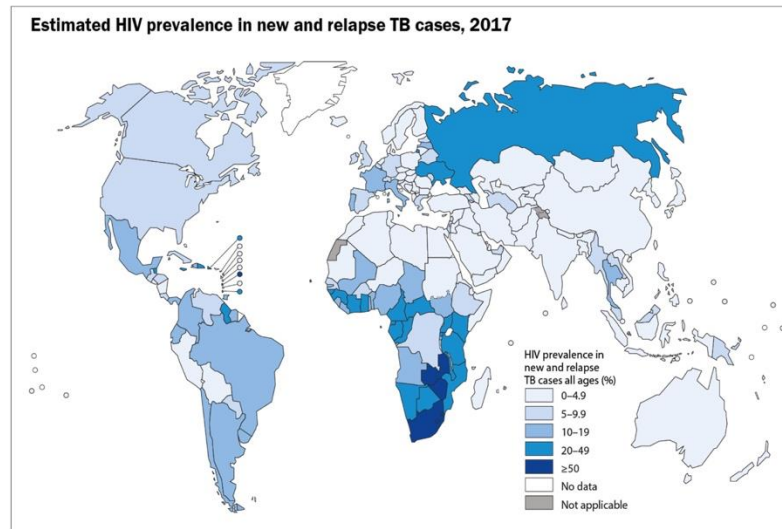
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Role of co-infection in disease dynamics across scales

Co-infections affect: host susceptibility, dynamics of infection, pathology, efficacy of vaccination, emergence of super-shedding events



Tb is a common opportunistic infection in HIV+, Tb & HIV epidemics fuel each other



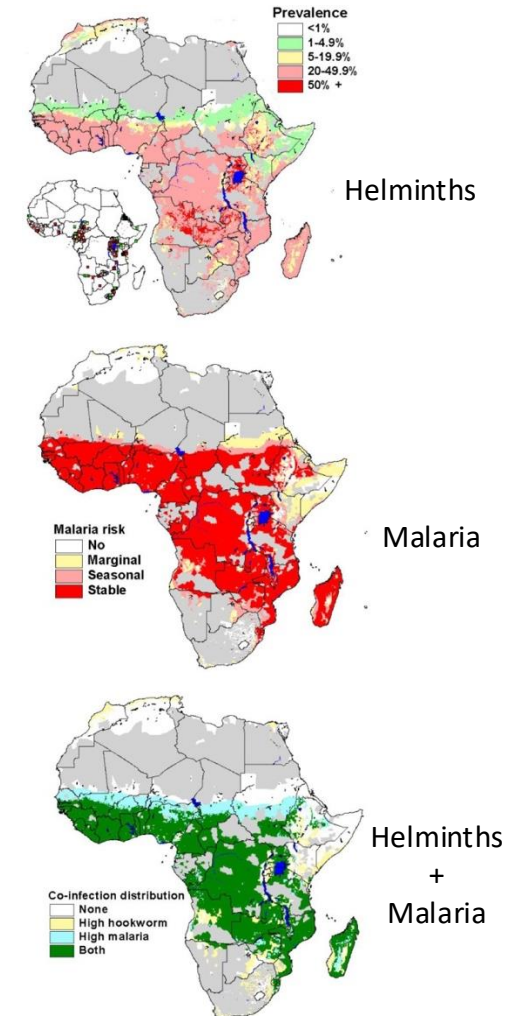
The boundaries and names shown on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: *Global Tuberculosis Report 2018*. WHO, 2018.

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World Health Organization

Helminths increase clinical malaria severity

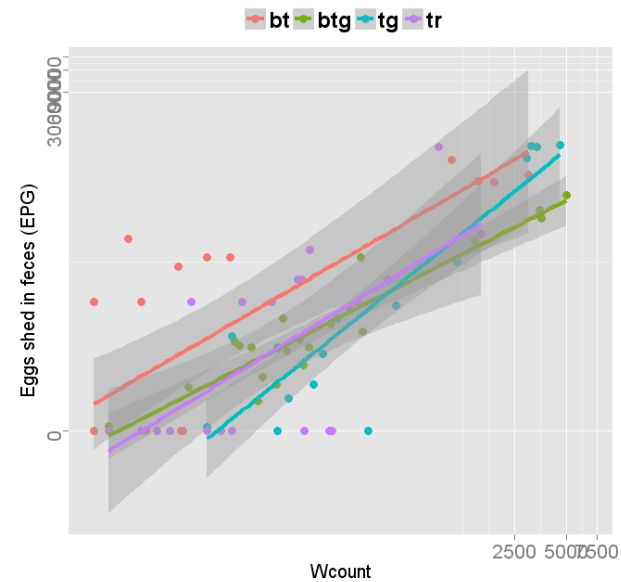
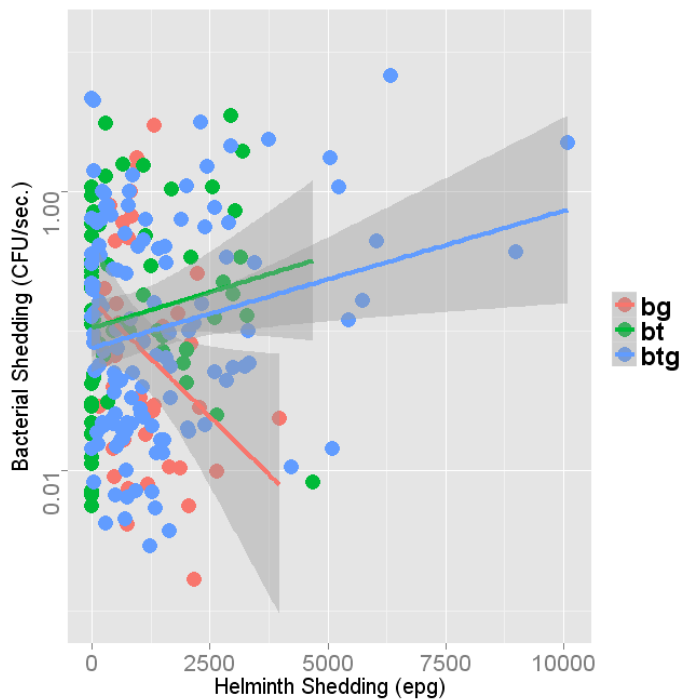
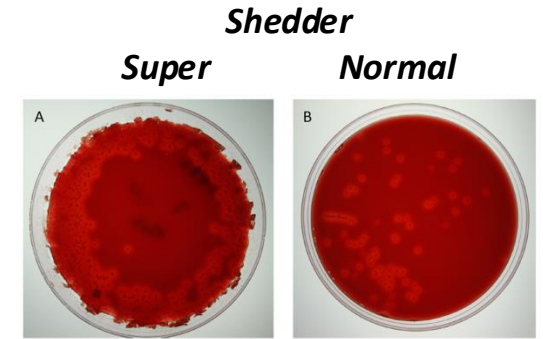


Role of co-infection in (super-)shedding dynamics

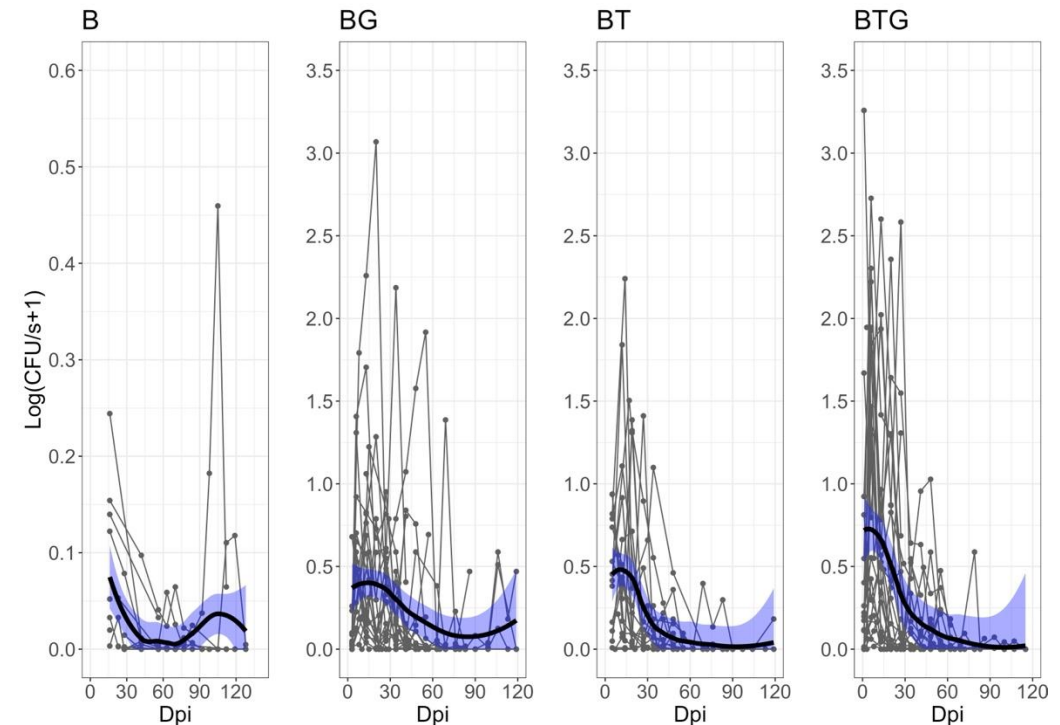
Bacteria-helminths system in rabbit.

How does pathogen/parasite shedding change with the type of infection?

Are super-shedding events a consistent feature in disease dynamics?



Helminth-driven Whooping cough (super-)shedding



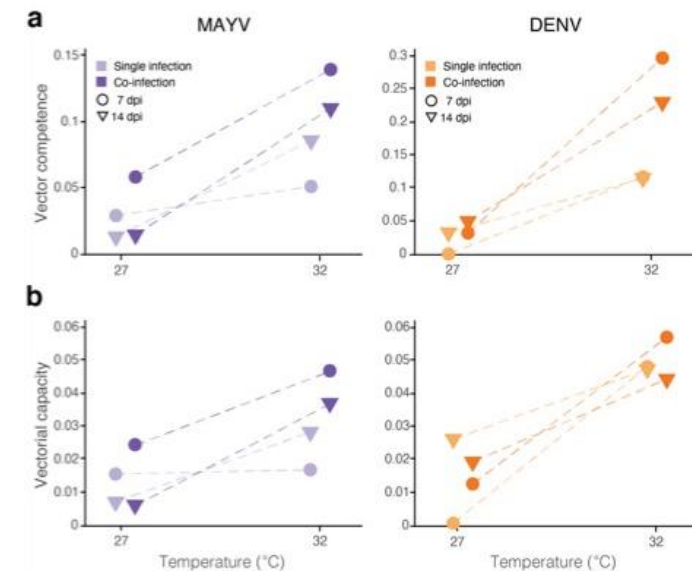
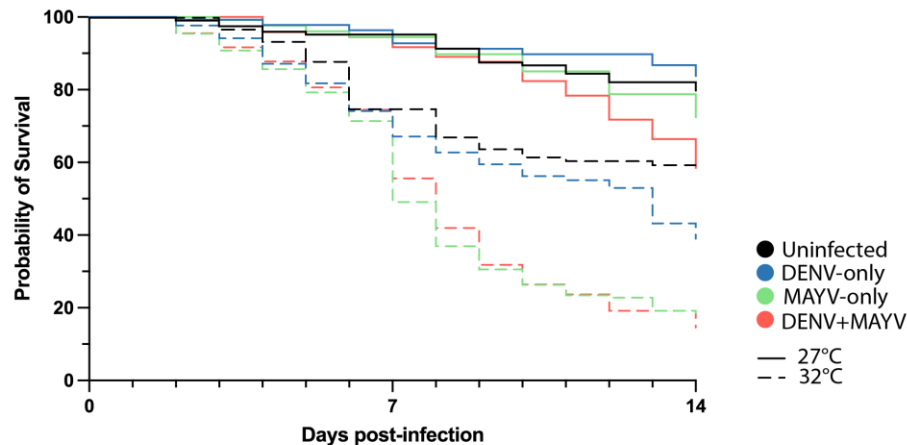
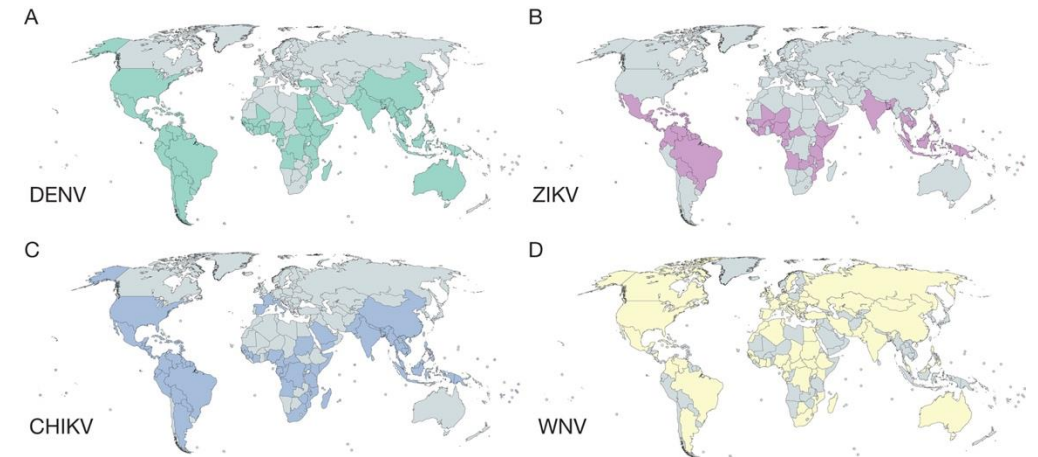
Arbovirus dynamics and risk of (co-)infection

Arbovirus infections are emerging globally caused by changes in climate, environment and anthropogenic drivers

Endemic tropical areas see an increase of arbovirus co-circulation and concurrent disease outbreaks

Temperate areas see range expansion and spread of mosquitoes and the pathogens they carry

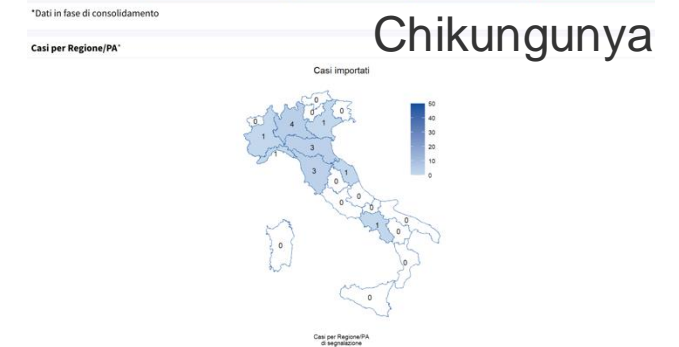
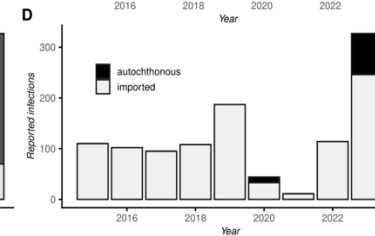
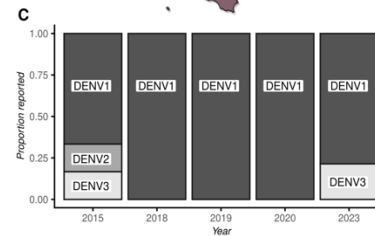
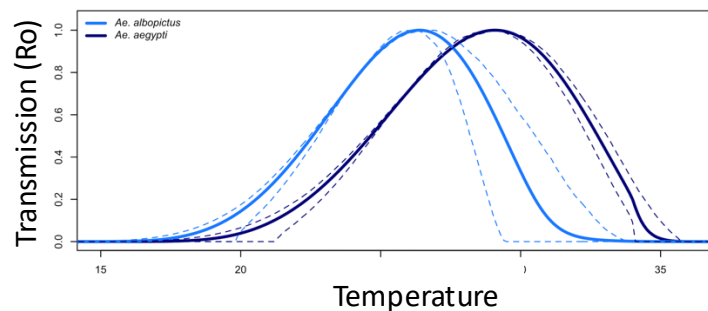
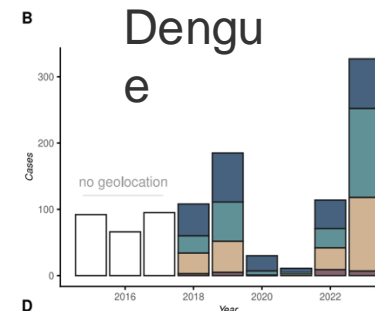
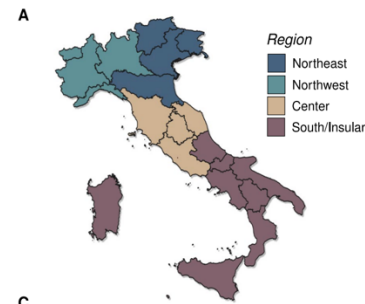
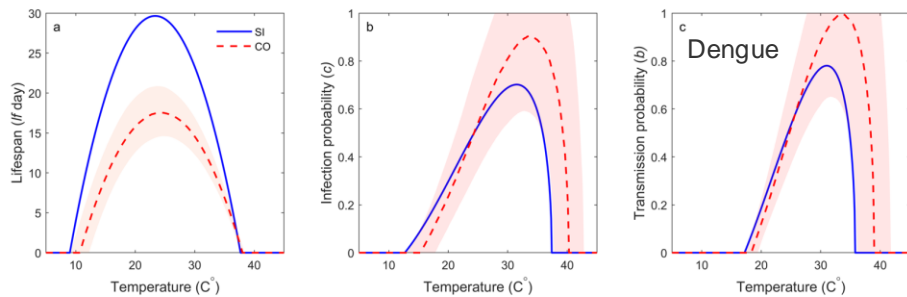
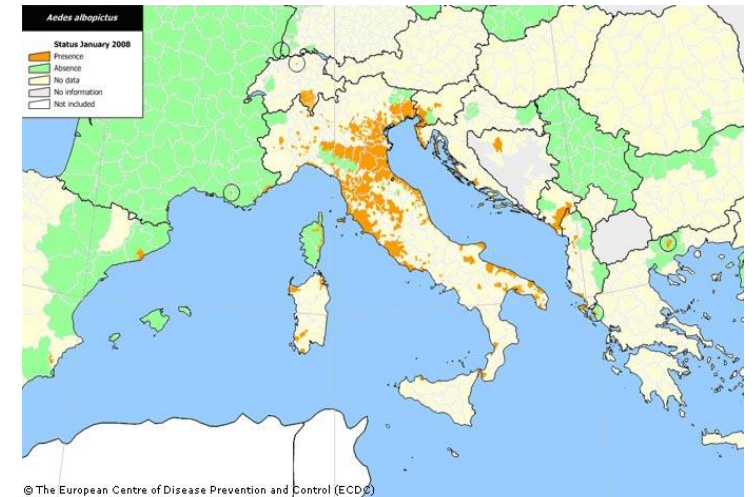
Global distribution of arboviruses based on previous or current transmission



Arbovirus (co-)infections in Italy

- *Ae. albopictus* distribution (climate/seasonality)
- Vectorial capacity (= ability to infect)
- Risk of infection (spatio-temporal)

Current *Aedes albopictus* distribution in Italy



Branda et al. 2024. *Sci Data* 11, 1325

<https://www.epicentro.iss.it/arbovirusi>

Many other thesis topics in Ecology and Evolution of Infectious Diseases

You want to know more:

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