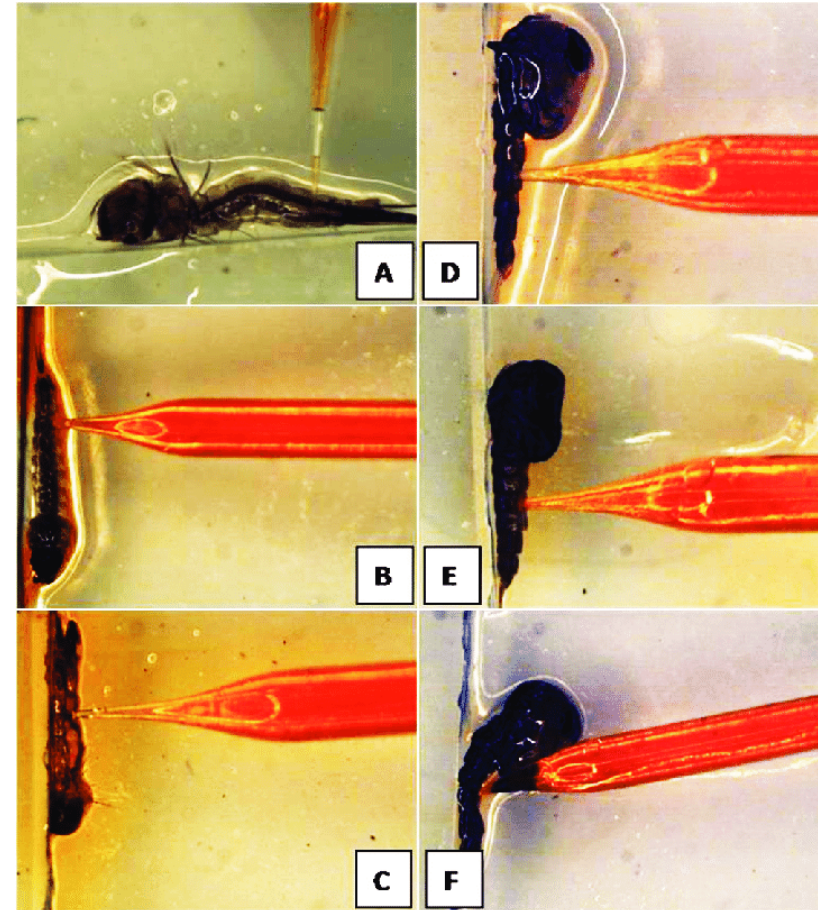
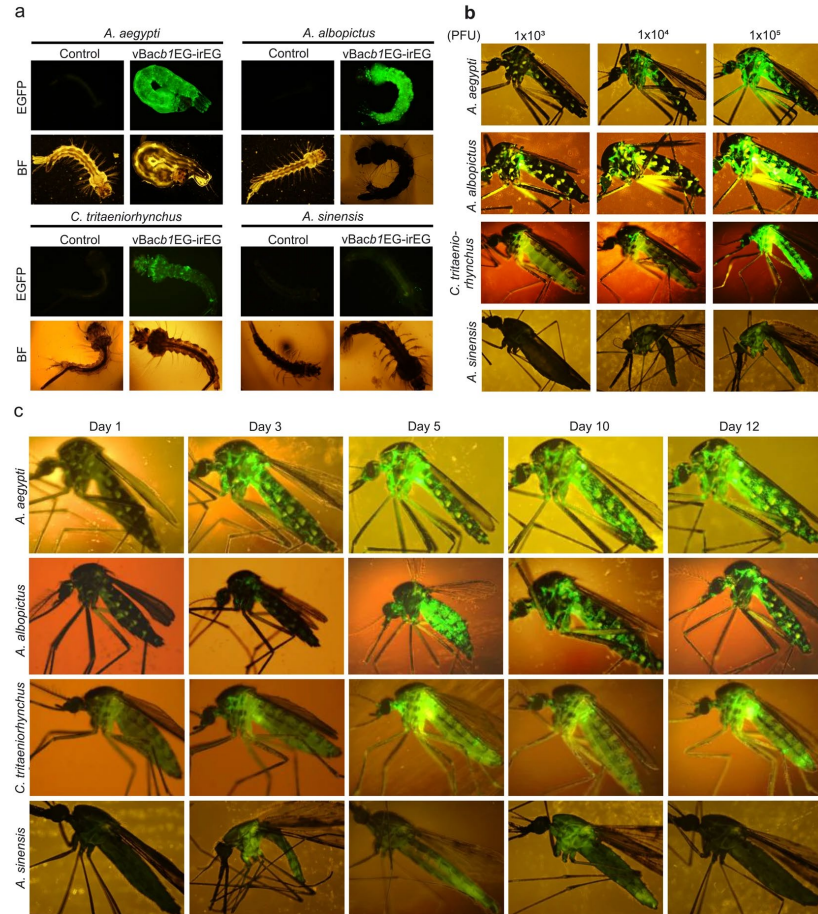


Ecotoxicology Evaluation of Genetically Modified Mosquitoes

Jessica Wong, Senior Environmental Scientist (Specialist)

October 30, 2024

Modified mosquito products



Kumar & Puttaraju. *Indian Med J Res* (2012)

Minimum required information

- What is the species?
 - Will there be males and females? Adults and juveniles?
- What is the active ingredient?
 - Are there any inert ingredients of concern?
- What is the mode of action?
- How long will it persist in individuals? Populations? Environment?
- Is there a counteragent?
- How do they compare to wild type?

Wildlife exposure – direct effects

- Physical contact
- Oral ingestion
- Bites



nwf.org, Photo: Joost Daniels

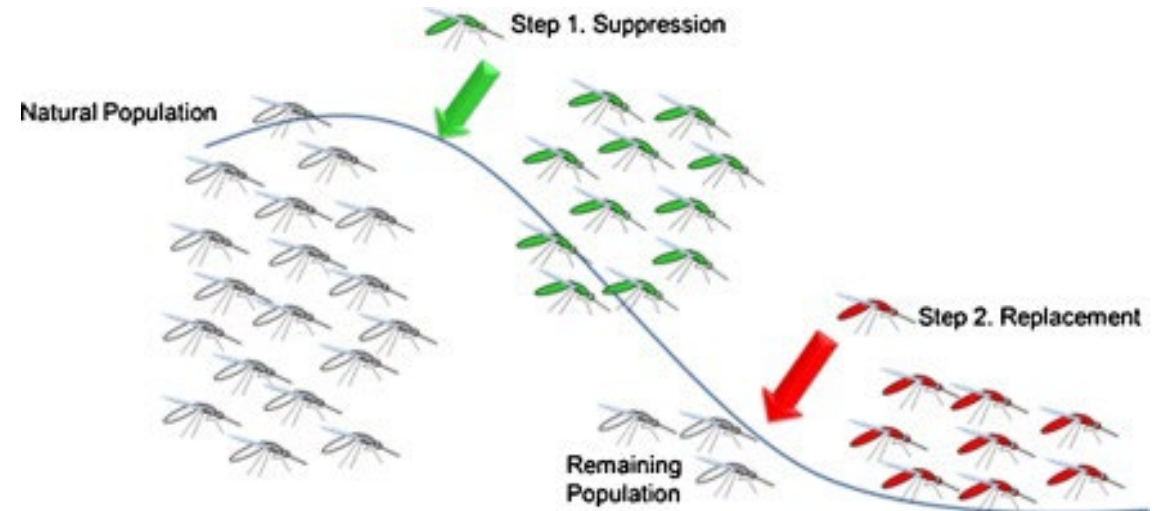
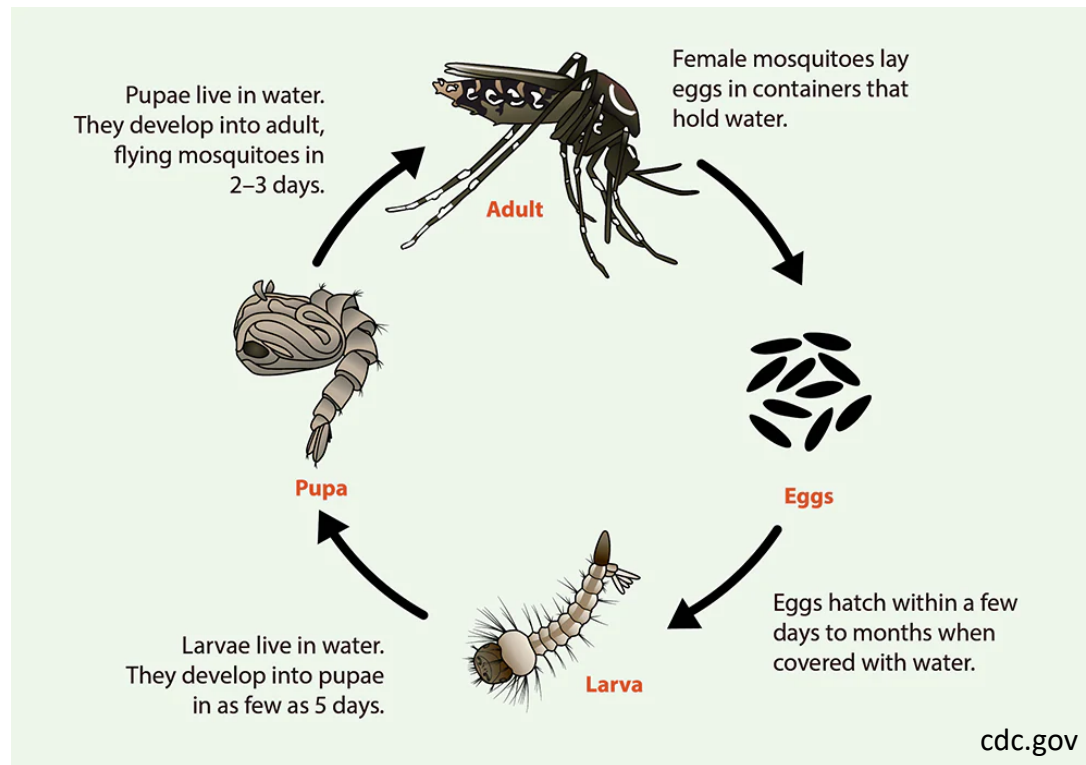
Ecosystem impacts – indirect effects

- Food web
- Ecosystem services



Credit: Tom, Adobe Stock

Aedes aegypti example



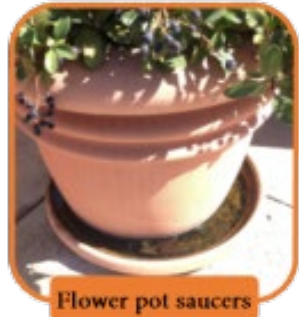
Carvalho et al. *Acta Tropica* (2014)

Direct effects: physical contact

- Is physical contact possible?
- Can genetic material transfer through physical contact?
- Are there any other possible effects?



Direct effects: oral ingestion



Flower pot saucers



Buckets/Containers



Fountains



Trash cans



Furniture



Rain Barrels



Tarps



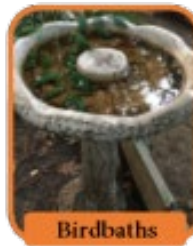
Kids' toys



Kiddie Pools



Wheelbarrows



Birdbaths



Watering Cans

- What are the habitat preferences?
- Can genetic material transfer through eating?
- Is it similar to any known toxins?

Direct effects: oral ingestion

- Oral toxicity tests
 - Aquatic predators
 - Terrestrial predators

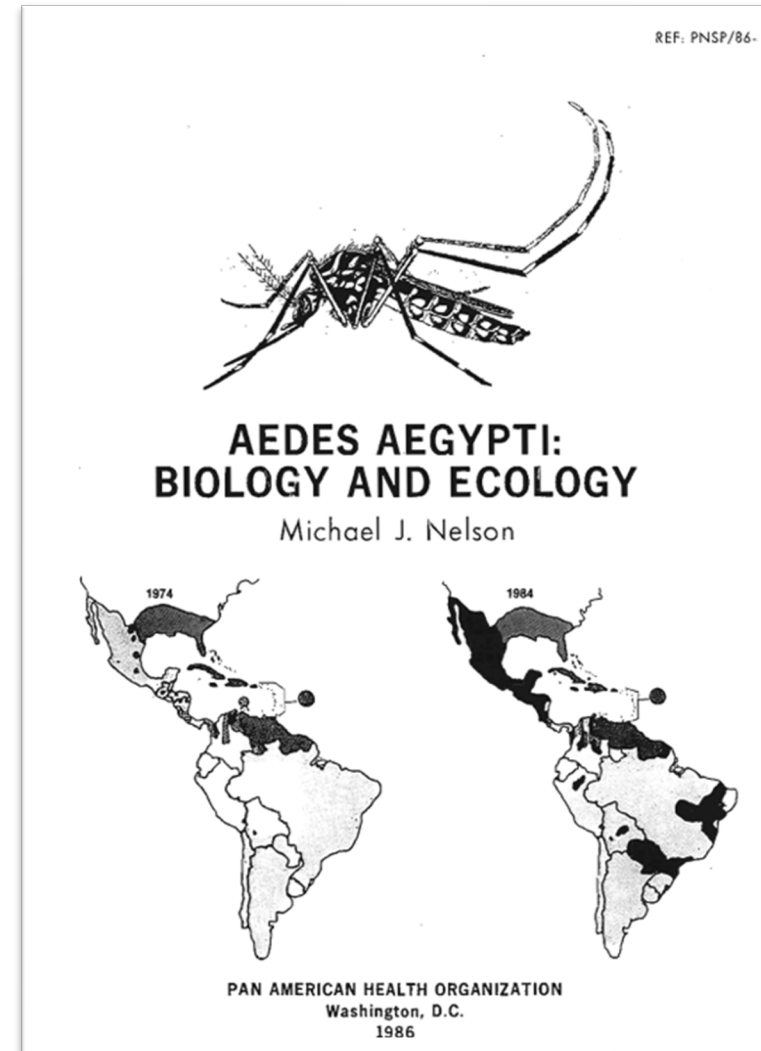
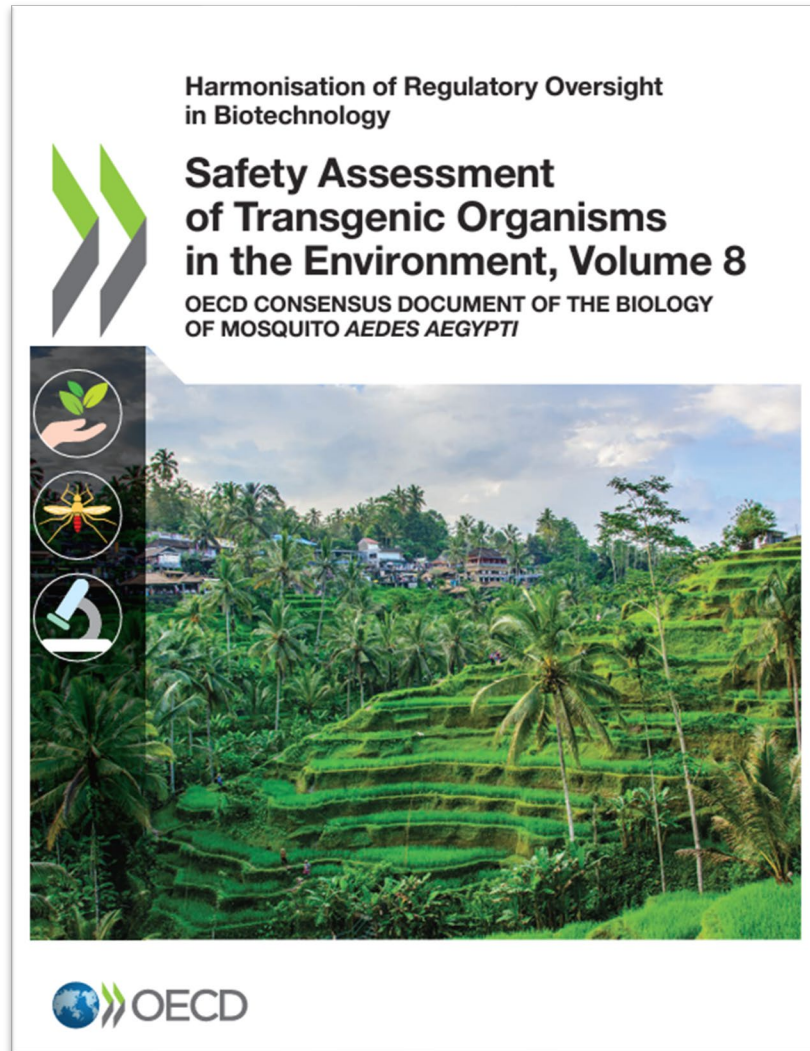


Direct effects: bites

- Will there be adult females?
- What are the host preferences?
- Can genetic material transfer through bites?



Indirect effects

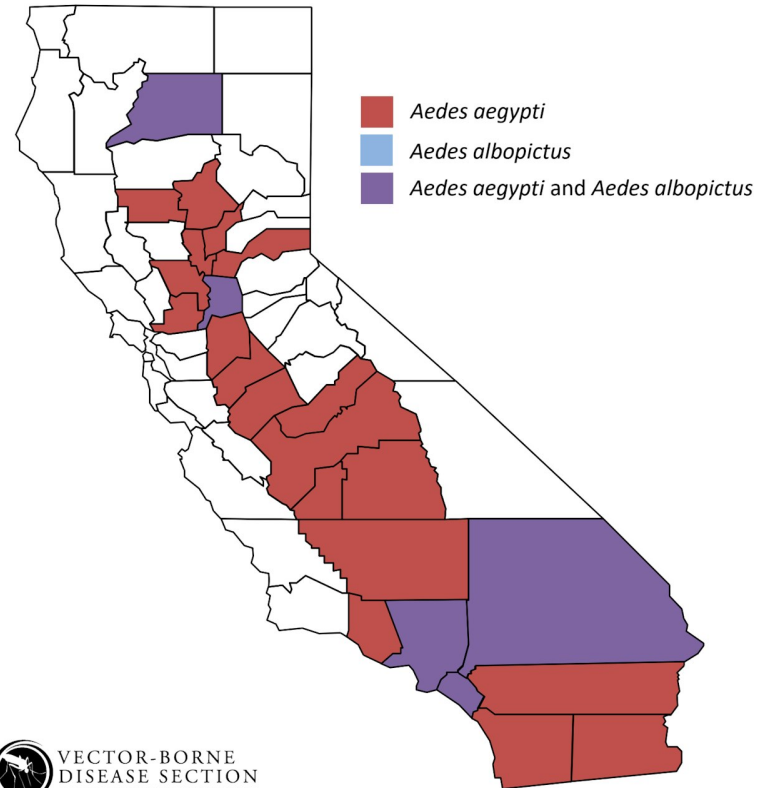


Indirect effects: *Aedes aegypti* in California

- Non-native
- No ecosystem function
- Minor food source
- Prefer humans

Aedes aegypti and *Aedes albopictus* Mosquitoes in California by County

Updated March 1, 2024



Counties with

Aedes aegypti only (19):

Butte, Fresno, Glenn, Imperial, Kern, Kings, Madera, Merced, Placer, Riverside, San Diego, San Joaquin, Solano, Stanislaus, Sutter, Tulare, Ventura, Yolo, Yuba

Counties with

Aedes albopictus only (0):

None

Counties with both *Aedes aegypti* and *Aedes albopictus* (5):

Los Angeles, Orange, Sacramento, San Bernardino, Shasta

For a list of cities, see

[Aedes aegypti and Aedes albopictus Mosquitoes in California by City or Census-Designated Place](#)

For a detailed map, see

[CDPH Interactive Map of Invasive Aedes Mosquito Detections in California](#)

Data requirements for RAs and EUPs

- Species life history
- Species dispersal capabilities
- Species status in CA
- Ecosystem function
- Mode of action
- Gene inheritance, introgression – hybrid effects
- Environmental persistence
- Oral toxicity data – species-dependent

Data requirements for Section 3

- All data submitted for RA/EUP
- Biological confirmatory data (collected during research)
- Ecological monitoring data (collected during research)
- Follow-up data if ecological concern is identified

Questions?

