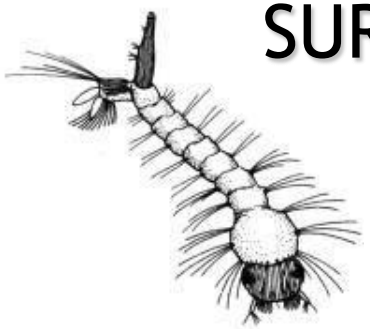
Surveillance Training for Public Health

or WHY DO MOSQUITO SURVEILLANCE?



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Without surveillance, mosquito control becomes a matter of luck.

Surveillance is the WHAT, WHEN, WHERE of control.

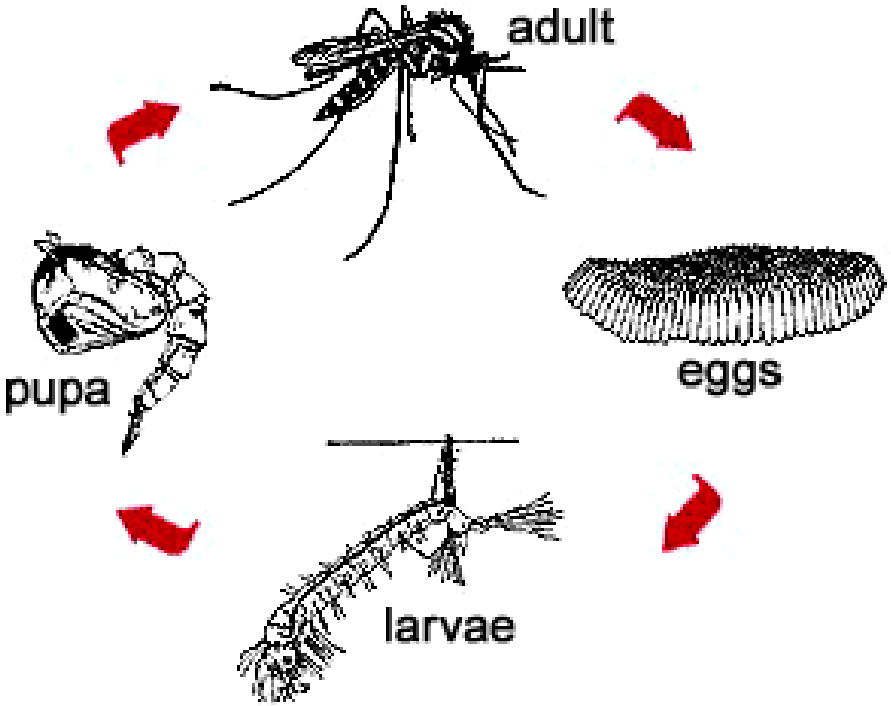
MOSQUITO LIFE CYCLE

egg

4 larval instars

pupal stage

adult



Types of Control Programs

Nuisance mosquito control programs

Used to control various species of mosquitoes that cause distress to humans and animals due to biting.

Large numbers of mosquitoes can have serious economic implications.

Vector mosquito control programs

Used to control one or more species of mosquitoes that transmit diseases to humans or animals.

Both programs can co-exist and be mutually beneficial.

REMEMBER - Nuisance is an public health issue

In the absence of diseases, mosquitoes can become so abundant that they cause disruptions in community services and cause severe stress in the affected local human, pet and livestock populations.

INTEGRATED MOSQUITO CONTROL

Source Reduction
Larval Surveillance - Larval Control
Adult Surveillance - Adult Control
Community Education / Communication
Mapping / Record Keeping

Arboviral Surveillance

Mosquito Surveillance

Mosquito surveillance should be the cornerstone of mosquito control.

No mosquito control program can operate effectively without a surveillance program.

Mosquito surveillance can reveal:

- The species of mosquitoes that are active in a community
- The presence of disease vector species
- The presence of mosquitoes infected with arboviral diseases
- The breeding habitats of the local species
- The size of the local mosquito population
- When to apply pesticides to control the mosquito population.

Benefits of Mosquito Surveillance:

- Provides data for local risk assessment
- Assists in making mosquito control decisions
- Saves money by fine-tuning control efforts
- Monitors for presence of arboviruses
- May provide early detection for other introduced arboviruses

Disadvantages of Surveillance

Labor-intensive.

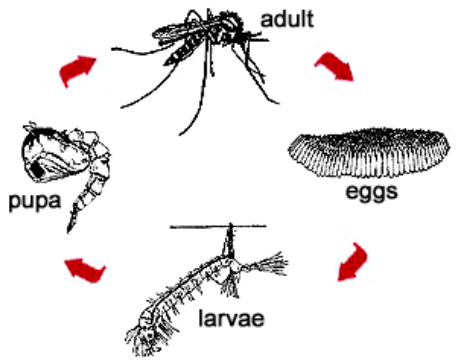
Substantial expertise is required for collecting, handling, sorting, species identification, processing and testing.

Requires sustainable funding.

- Surveillance is the “missing link” in many mosquito control programs.

- Without good mosquito surveillance there is no economically sustainable way to reduce human risk of mosquito-borne diseases OR get good nuisance species control.

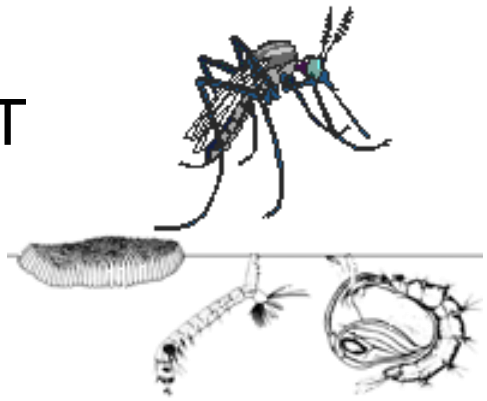
- Requires funding to be sustainable!!!



What type of surveillance is done depends on how the data will be used.

ALL MOSQUITO SURVEILLANCE SHOULD HAVE A PURPOSE:

- MOSQUITO CONTROL – LARVAL OR ADULT
- ARBOVIRAL SURVEILLANCE
- PUBLIC EDUCATION



MOSQUITO SURVEILLANCE SHOULD NEVER BE DONE WITHOUT A SPECIFIC GOAL IN MIND.

Mosquito surveillance can be passive:

"Complaints, Complaints, Complaints!
I need to send someone out to do some landing counts and see what kind of control might work there."

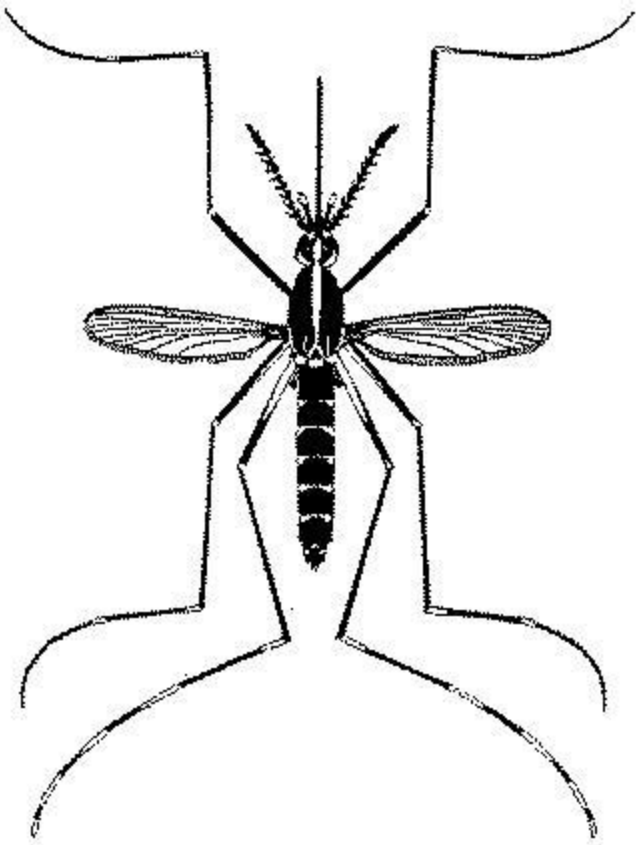
Mosquito surveillance can be based on limited trapping:

"Would you set a light trap at that complaint site? We have already larvicided there and I need to be sure what species we are dealing with so we can decide what to do." ID MUST BE DONE

Mosquito surveillance can be based on active surveillance:

"Wow, there are a lot of mosquitoes in that sentinel trap and they all look like *Culex* spp. We might have a problem here. What kind of control measures have we used already?" ID MUST BE DONE

Complaints should always be followed up by surveillance of some kind to avoid waste of limited resources.



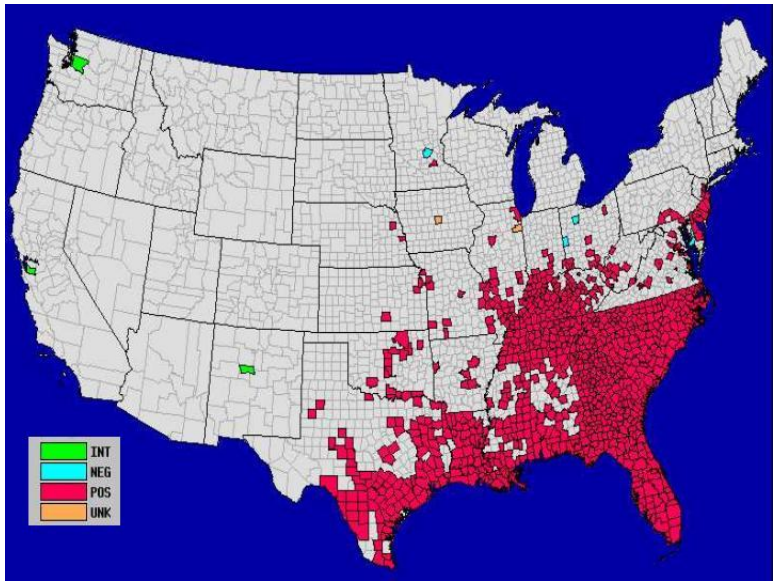
follow up with:

landing counts
adult surveillance
larval surveillance

AND EDUCATION

When to do landing counts?

- Mosquito control is complaint driven
- *Aedes albopictus* is a problem in the area
- Emergency mosquito control is needed due to flooding and no other surveillance is available



map of the range of *Aedes albopictus* in the US

In urban and suburban area in Georgia, at least 90% of mosquito calls will involve *Aedes albopictus*, the Asian tiger mosquito. Things to ask the caller:

a. Is the mosquito biting during the day? Asian tigers are daytime biters.

b. Where is the mosquito landing to bite? Asian tigers are primarily leg biters.

c. Is the mosquito small and black and white? You most likely have tigers.

If these are tigers, truck spraying will not help.

other species may also show these characteristics

Always follow up calls with a site visit.

Landing Counts

"Landing Counts" record the number of mosquitoes that land on the observer over a designated period of time.

It is suggested that they be taken over either a 1 or 5 min period. If the landing rates exceed 50 in 30 sec, the interval can be shortened to protect observers that are expected to conduct numerous counts.

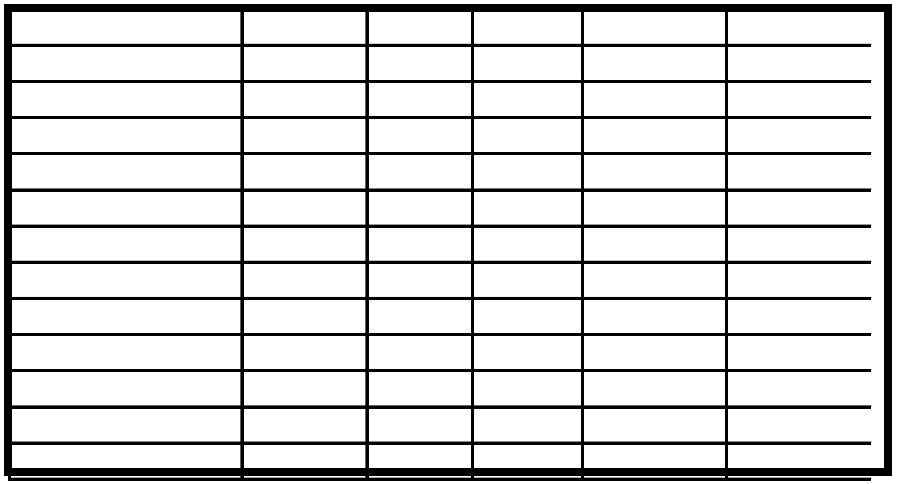
Landing counts may involve identification, but they are normally employed in areas where a single, known species is the sole cause of annoyance.

Guidelines

- Wait a period of time before starting to collect.
- Disturb the vegetation before starting.
- Wear light solid-colored clothes.
- Wear no repellents.
- Wear no perfumes or aftershave.
- Stand up and stand still while taking count.
- Remember, mosquitoes react differently to each individual

Information to Collect:

Collector's Name
County
Site
Date
Time
Location on Body



For counts of less than one minute, multiply to get landings per minute.

Thresholds for Landing Counts Vary

Excessive Landing Rate Counts:

- In populated areas >25 mosquitoes/minute
- In relatively unpopulated areas >50 mosquitoes/ minute

THIS WILL VARY ACCORDING TO LOCATION, MOSQUITO SPECIES, AND HUMAN POPULATION

Remember, landing counts will give you info on whether human biting mosquitoes are present.

Landing counts, along with field ID of *Aedes albopictus*, will let you know if adulticiding is needed.

Landing counts will NOT give you info about where to larvicide unless you are also ID'ing the mosquitoes.

Larval Surveillance

<u>provides information about</u>:

potential mosquito populations

larval habitat

sites needing control

larval ID is important to avoid controlling mosquitoes that are not nuisance or vector species

ADULT MOSQUITO SURVEILLANCE

Benefits of Mosquito-Borne Disease Surveillance:

- Increased detection of endemic mosquito-borne diseases
- Determining risk factors
- Determining population at highest risk
- Increased understanding of disease process and outcome
- Better disease diagnosis

MODEL PROGRAM

1. Data are collected at sentinel sites

2. Mosquitoes are identified and graphs are used to monitor changes in vector populations

3. When predetermined action thresholds are exceeded, an action (press release, education, monitoring, larviciding, adulticiding, etc) occurs

4. Arboviral “testing” sites are established throughout the area

5. The public, the community, and the municipalities are encouraged to take active roles in decreasing mosquito populations through community cleanup, personal protection measures, and mosquito control - the role of the health department is supportive

Dealing with FEMA

FEMA wants 3 years average surveillance data to show what is above and beyond normal for the time of year covered

Collecting Data: light traps, landing rates, numbers of service requests - anything to document the "normal" background level of activity

Employee records of overtime have been accepted in few cases but this is not guaranteed

FEMA definitely prefers more scientific data (not just numbers of mosquitoes but percentages of genera and/or species represented)

Even if you start today, any surveillance data you have can be used to show the need for help in the future

Get to know your local emergency response department now, not when there is an emergency

check www.fema.gov, http://www.gema.state.ga.us/, and http://www.emacweb.org/ for more information

Any Questions?

Mosquito Mania / *The New York Times*